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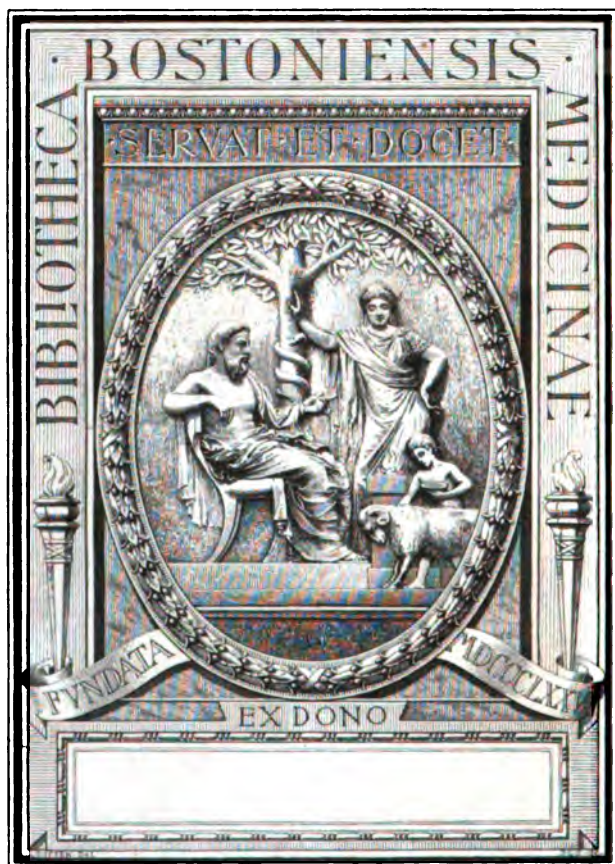
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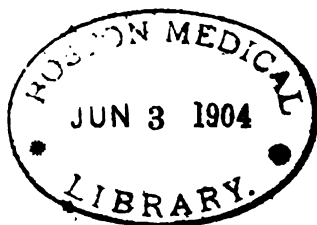
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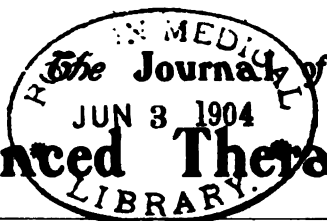
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EPITHELIOMA OF THE TONGUE.*

BY CHARLES DICKSON, M. D., TORONTO, CANADA,

Electrotherapist to Toronto General Hospital, St. Michael's Hospital, Hospital for Sick Children.

My purpose in presenting this brief paper is to seek information rather than to impart it, for I must confess that I have come to our annual meeting with a liberal supply of interrogation points, eagerly desiring knowledge; hence, my paper should properly be entitled, "How may we best treat Epithelioma of the Tongue?" and I trust that the question will be answered by the association.

The question has been brought before me prominently by reason of four cases which have consulted me in the last five months, and more especially by the first of these, and the chief points of his history I shall briefly state.

On April 11, 1902, I was consulted by J. W., age forty-six years. About March, 1899, he noticed a lump on the right side of his tongue, towards the back of it, which was not very painful. It was operated upon by a confrère on April 25, 1899, and again on May 25, 1899.

At the end of February, 1902, another lump began to form at the junction of the anterior pillar of the fauces with the tongue, and was much more painful this time; the pain being steady and chiefly occurring at night, preventing sleep. Any motion of the tongue, such as eating, or even talking, now became painful.

I determined to try the effects of the X-ray on his case, and beginning on April 15, 1902, he was exposed to the radiance almost daily for some time, the length of séance

* Read at Twelfth Annual Meeting of the American Electro-Therapeutic Association at The Kaaterskill, Catskill Mountains, N. Y., on September 2, 3, and 4, 1902.

being at first ten minutes, and later from fifteen to twenty minutes. The tube was placed about one foot away the first time of using, the distance was gradually decreased at future treatments, until the globe was almost touching the lips occasionally.

For the first few applications a flat screen of thin sheet lead was used to shield the face, a hole being cut to correspond with the open mouth; then, a mask was constructed by coating a "false-face" with heavy tin foil, the lower jaw of mask being cut away and an apron of sheet lead substituted, both lips being protected by lead aprons. Next a funnel of lead for use with the mask was devised to hold the tongue to one side, and also to restrict the radiance to the parts affected. Then a self-retaining tongue depressor was tried with the mask. The location was by no means easy of access.

The patient reported that the first freedom from pain in ten weeks followed the second treatment, and that he had slept well for the first time since recurrence. This freedom from pain lasted for a couple of days, when the pain returned as severe as ever, but each treatment afforded some temporary relief.

On May 5 the lower jaw was rayed at about six inches' distance. On May 20 less fetor was noticed; a slough came away during the evening. The following evening a second slough became detached and a comfortable night was passed.

On June 16, not being satisfied with the progress of the case, the X-ray was discontinued; mercurial cataphoresis was had recourse to about every other day—a zinc electrode being amalgamated with metallic mercury for the purpose—with a current strength of 10 ma. gradually increased to 20 ma. for fifteen minutes, and on the 17th and 19th, 10 ma. for ten minutes. On 20th the patient reported less pain, less swelling, and more sleep. Cocaine anæsthesia was employed at each treatment by means of a pledget of cotton wool saturated with twenty per cent. solution placed against the affected portion of the tongue. On 21st mercurial cataphoresis, 30 ma. for five minutes and 20 ma. for five minutes; 23d, 10 ma. for ten minutes. On 27th he reported a good sleep for the preceding night and was able to take solid nourishment for the first time in several months, his breakfast comprising boiled eggs, bread, and butter. On July 2 the

patient reports that he is sleeping much better, and on 9th he reports continued improvement in general health, that he has gained about ten pounds in the last two months, swallows better, sleeps better, and has less pain.

But, in spite of the cocaine, the patient grew to dread the cataphoresis very greatly on account of the pain incurred at the time, and on July 30 this treatment was discontinued and the jaw rayed from the outside for twenty minutes at six inches range. The second raying afforded much relief from pain. The raying was continued on alternate days up to August 14.

But, as the disease seemed to be making progress and the pain increasing in severity, the mercuric cataphoresis was again resorted to on the following day, 15 ma. for five minutes and almost daily thereafter in addition to the X-ray externally for ten minutes, and the patient is still (September 3, 1902) under this treatment.

Immediately upon the appearance of an article by Mr. E. W. Caldwell on the treatment of malignant growths of the throat, rectum, etc., I ordered the tubes and shield described by him in the hope of improving my technique, but unfortunately, being a new form of apparatus, it has not yet been received.

The second case of this series of epithelioma of the tongue was referred to me by a confrère with the request that I should try cataphoresis, using a five per cent. aqueous solution of chromic acid. The patient had already undergone raying by another confrère with the same result as my own, but in an aggravated degree, viz., much destruction of the substance of the tongue, with great enlargement of the glands, and swelling about the throat, rendering swallowing and speech difficult. On account of the great pain produced by the cataphoresis the treatment was only tried a couple of times, when the man declined further interference of any sort.

The third case of the series was sent to me for daily treatment by cataphoresis, which he received from July 1 to 16, using, on alternate days, five per cent. chromic acid solution and a solution of arsenic four times the strength of Fowler's solution for ten minutes at a time, and varying the amperage from 20 to 30 ma., first applying adrenalin chloride solution

1-1000, followed by twenty per cent. cocaine solution. It was impossible for the patient to remain long in the city.

In this case the trouble had only existed a few months, was not extensive, and was situated to the left of the frenum and beneath the front of tongue.

From July 8 to July 16 the latter half of each séance was occupied with mercuric cataphoresis, usually 20 ma.

No X-ray was employed in the case. The tongue was rendered very sore by the treatment.

A letter received the latter end of August states that the patient considers that the lump has disappeared completely, but that he will call for inspection.

For the fourth case of the series I am indebted to the same confrère as in the two preceding. In January last the right half of the tongue was excised. About May 1 a lump was noticed at the angle of the right jaw.

From July 31 to the present time this gland has been rayed at close range thrice weekly. It has increased in size and is more tender than before treatment was instituted.

In my hands, hitherto, I have not derived from the X-ray that benefit in the treatment of epithelioma of the tongue that it has afforded in so many other malignant conditions.

Is this unsatisfactory result to be attributed to faulty technique on my part, or is my experience borne out by that of other members of this association? Cicatricial tissue exhibits a marked tendency to break down under the influence of the ray; perhaps results would be better in cases which have not been operated upon.

Again, what has been the experience of the members in regard to the employment of cataphoresis in this condition, *i. e.*, epithelioma of the tongue?

I would particularly ask the committee on cataphoresis what pressure is necessary to diffuse metallic mercury from a zinc electrode in the form of its salt into the living tissue? What is the correct strength of current to be employed in such cases, and what results can we reasonably expect? What is the correct technique to be observed? Is anæsthesia by cocaine cataphoresis the preferable method?

In a word, let me repeat my first question and ask for a very full and free expression of opinion on "How may we best treat Epithelioma of the Tongue?"

DISCUSSION.

Dr. G. Betton Massey said that a trace of copper or of tin would increase the amalgamating qualities of the zinc. He objected to the soft rubber insulation on the electrode presented by Dr. Dickson on the ground that it could not be readily sterilized. It was far better to freshly fuse sealing-wax upon the instrument each time it was used. If the instrument were passed too slowly through the flame the mercury would be vaporized—indeed, this was an excellent way to get rid of the mercury when, for any reason, it was not desired upon a metal instrument. The paper reminded him of two cases. One of these was a sarcoma of the base of the tongue. A strong treatment for those days (1898) was given with a current of 200 ma. for fifteen minutes, using a blunt and thoroughly insulated electrode. The man was very much more comfortable the next day, and owing to the great shrinkage of the growth deglutition became less difficult. The second case was one of epithelioma of the tongue, the size of a quarter of a dollar, situated on the dorsum of the tongue, a little beyond the middle. The patient was a strong Irishman of alcoholic tendencies, so he took ether badly. He received a treatment with a current of about 400 ma. for half or three-quarters of an hour. The slough came away nicely, but a little point being left, a second application was made at the end of two weeks. The patient was placed upon a spring cot with a very large pad, connected with the negative pole, under the back. The other electrode was a blunt amalgamated zinc rod attached to the positive pole. The final result was a complete cure of the epithelioma of the tongue, a fact verified by Dr. G. G. Davis of Philadelphia. One month later a lump developed in the glands of the neck, and the patient refused to be etherized or to submit to further treatment. When seen three months afterward, the growth was so large that the speaker hesitated to make use of the electrical treatment again. In a short time the man succumbed to the advances of the disease.

Dr. H. P. Pratt said that he had treated four cases of epithelioma of the tongue, and had succeeded in curing two cases. The other two died, as he now believed, because he did not know how to treat them. The first case was that of a physician living in Minneapolis. The growth had been examined by a number of pathologists, and had been pronounced an epithelioma of the tongue. She was at the present time perfectly well. The treatment consisted in opening the mouth, placing a celluloid speculum in it, and allowing the rays to strike the cancer. The treatment was given daily for five or ten minutes for a period of three or four months, and at the same time the X-ray was also passed through both sides of the neck, the direction of the rays

being frequently changed. He used celluloid because it afforded less resistance than any other material. He used it also in the treatment of vaginal and rectal troubles. In another case, after a time, he made use of the static breeze and this was followed by a rapid spread of the infection. It was for this reason that he had insisted, in a previous discussion, that the static breeze should not be used on muscular tissue.

Dr. J. D. Gibson said that on his way to this meeting he had seen an old sea captain in Georgia with a cancer of the tongue. The case was in a hospital and under the care of Dr. Daniels, and was said to be almost well. All enlargement had disappeared from the submaxillary and sublingual glands, and there was no open ulcer about the tongue. There was a large crucial cicatrix and the tissue around this seemed to be a little hard. The motion of the tongue was considerably restricted. He understood that the case had not been treated for twelve months, and the appearances indicated that it was not thoroughly well; nevertheless it was a very interesting result of X-ray treatment.

Dr. W. B. Snow said that he had had a good deal of experience with the brush discharge in the treatment of open surfaces, and he had never met with infection as a result of this; indeed, there should not be any such infection in the treatment of these open cases. He used the brush discharge for its tonic effect. By means of a special electrode which he employed the discharge could be localized to the desired part, and it was certainly an excellent antiseptic application. The patient should always be negatively insulated, the discharging rods widely separated and the electrode made of wood and the ordinary pointed one might be insulated by a tapering covering of glass when it was desirable to make the application within a cavity, as the mouth, ear, or vagina. He believed many cases of malignant disease could be as well treated through the face, or from below, as by the use of a speculum.

Dr. Pratt said that he had used the same thing, even to the wooden electrode, but he had moistened the latter, and the patient had done very badly since then.

Dr. F. B. Bishop said that one reason that Dr. Dickson probably had not gotten more effect from his galvanic treatment was that his active pole had too much surface for the amperage—only 20. The surface used was sufficient for a current of 150 ma.

Dr. G. B. Massey said that long experience led him to absolutely agree with the remarks made by the last speaker.

Dr. Dickson said, in closing, that it had not been considered advisable to use more than a local anæsthetic, and it was for this reason that this size had been employed.

A NEW SYSTEM FOR PRODUCING A SLOWLY ALTERNATING CURRENT OF LARGE AMPERAGE FOR THERAPEUTIC USES.

BY LUCY HALL BROWN, M. D.

The apparatus before us is the invention of a Mr. Patten. It includes several important improvements made by the manufacturer, Mr. E. A. Calahan of Brooklyn. To the latter we are indebted for the loan of the apparatus that we may examine it in operation.

Briefly, the system consists in taking any straight continuous current such as the Edison street current or the usual office battery of sixty cells and transforming that straight current into a slowly alternating current of the sinusoidal type and with a frequency of alterations from one to fifty per minute.

Again, to take this before-mentioned Edison or office battery current and transform it into a slowly undulating straight current of the sinusoidal character. In either case the current is of the true sinusoidal type and of a strength more than sufficient for all requirements.

These characteristics distinguish this current from the currents produced by the faradic coil, the small sinusoidal generators now in use, and the alternating electric light current. In these three the frequencies are anywhere from 500 to 3000 per minute, and in the case of the faradic coil and small generators there is hardly enough current given by them to move the needle of the ordinary milliamperemeter from its zero point. With this new apparatus we get the slow alternations and a current strength ranging from zero to three hundred or more milliamperes.

In the treatment of a chronic case of constipation, for instance, where it is desired to effect a strong muscular contraction and relaxation, a current strength of twenty to forty, or even more, milliamperes is necessary. Such a current, to be borne comfortably by the patient, should be of the slow sinusoidal character. Let me describe the apparatus:

It consists of a tub made of insulating material and half filled with water, preferably distilled water. At diametrically opposite sides of the tub are fixed two carbon plates in an

upright position. To these two plates are connected the wires from the Edison mains or the wires leading from the office battery. The one on the right, marked in red, is the positive, and the one on the left, marked in green, is the negative. In case the street current is used, an incandescent lamp is interposed in this external circuit.

At the center of the tub a spindle carries a revolving arm also of insulating material, which is revolved by clockwork as in the apparatus before us, but preferably by a small electric motor which can be better controlled.

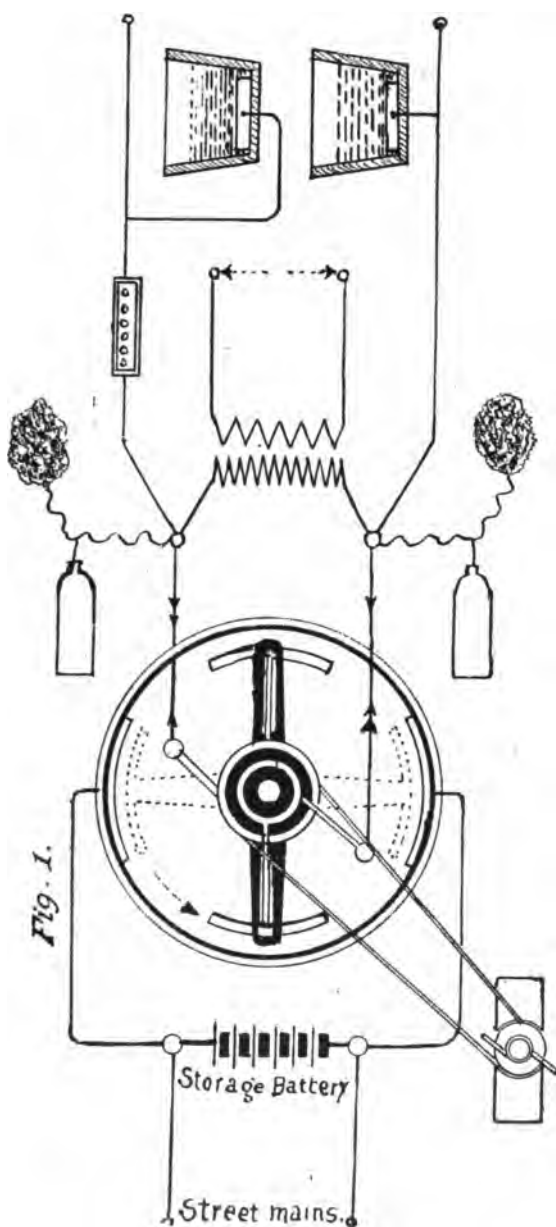
This arm carries at its extremities two carbon plates which connect through suitable brush contacts to binding posts, and wires from these lead to the patient. In this patient's circuit is included the usual controller and milliamperemeter.

By this arrangement the patient is placed on a shunt circuit, which is generally admitted to be the better.

If now the spindle be set in motion the two carbon plates are carried around through the water, and as they approach the fixed plates a current will be set up in the patient's circuit which will gradually and uniformly increase in strength as the fixed plates are approached, and as these are passed the current to the patient will gradually and uniformly decrease until a point exactly midway between the fixed plates is reached, when no current will pass to the patient; but the plates continuing to revolve, current again gradually increases in strength, but now in the opposite direction, and so in this manner the current to the patient smoothly and gradually rises and falls, first in one direction and then in the reverse direction, so long as the plates continue to revolve, which may be from one to more times per minute as desired.

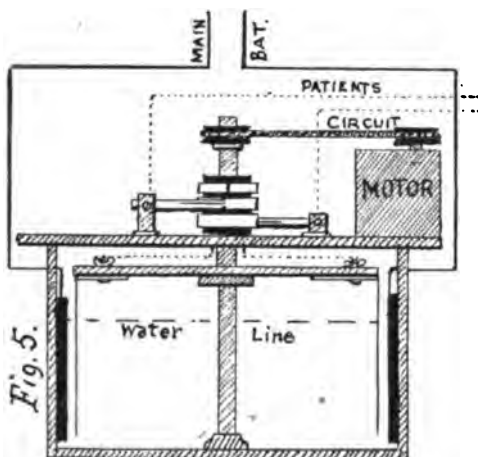
Now what are the effects of applying to the muscles, nerves, or other tissues, such a gradually increasing current, running it up to forty or more milliamperes and then gradually back to zero, and then in the same gradual manner sending it in the opposite direction through the same tissues? Dr. E. H. Bartley of Brooklyn, who has had an experience covering several months with this new apparatus, says:

"It would seem that, taking the negative electrode for the illustration, there would be produced a stimulation of nerves and muscles during the increase in the current, that is, during its approach toward the negative fixed plate, and as it



passes this point and recedes from it there would be a sedative or inhibitory effect upon the nerve, but the stimulating effect is followed by a rather sharp contraction, which is increased by the positive current coming up at this time.

"When the reversal of the current is slow and sinusoidal the muscle is allowed time to relax gently between the contractions, and is brought into an activity similar to the usual physiological or rhythmical contraction. The effect of this rhythmical contraction and relaxation must be better than



the prolonged clonic contraction of induced currents that exhaust, or the painful sudden jerk of the interrupted galvanic current."

When the electrodes are held one in each hand, as shown in the model, the subjective symptoms are a feeling of warmth in the forearms with a strong current above the elbows. This warm sensation is more decided about the negative electrode, and changes from one arm to the other as the alternations occur.

There is a gradual tightening of all the muscles of the arm, and with each revolution the usual metallic taste is observed.

The systemic effects of this alternating current are to increase local capillary circulation. In old palsies, where degeneration and atrophy have progressed to a considerable degree, this current causes contractile response when the ordinary faradic and galvanic currents fail. In sciatica the results have been variable, and in other forms of neuritis it

has rather aggravated than relieved the pain. In cases of myalgia the results have been good, relieving the pain and tenderness very promptly.

Owing to the very recent completion of this apparatus the number of cases treated has not been sufficient to admit of a more complete generalization.

When a straight sinusoidal current is desired, that is, a current flowing in one direction but sinusoidal in character, it is simply necessary to turn a small switch, which causes the necessary changes to be made in the connections where the brush contacts are located. This straight current is in all respects similar to the one described except that it is not alternating.

DISCUSSION.

Dr. A. D. Rockwell said that the reader of the paper had raised the question as to what was the effect of the current from this apparatus. He thought she had correctly said that this current would not relieve pain when due to a neuritis or any acute or subacute inflammatory condition, because there were both mechanical and chemical effects. In a somewhat kindred field, *i. e.*, with the combined galvanic and faradic currents, he had learned that these pains would not be relieved as well as by either the high-tension current or the galvanic current alone. On the other hand, he had found it was useful in spasmodic conditions, though he could not exactly state why this was so. He believed this current would relieve pain when there was no congestive condition or tenderness on pressure. He had long ago come to this conclusion.

Dr. G. Betton Massey was of the opinion that this was the best alternator that he had ever seen, and the idea of using water to change the strength of the current in this way seemed to be absolutely novel and original. He would predict a good field for this current in chronic constipation from atony, and in atonic conditions of the uterus and vagina.

Dr. Waite said that he had seen the machine before it was patented, and it certainly produced a simple sinusoidal current. A similar apparatus had been sold in New York city for some years.

Dr. H. P. Pratt said that he was greatly interested in this interruptor, because at one time he had been a manufacturer of electrical goods. It was certainly the best instrument of its kind, and the one sold in New York city and referred to by the last speaker could not be compared to the one just exhibited. He thought more could be accomplished with it than with any other instrument of its kind mentioned.

SOME CLINICAL INDICATIONS FOR THE USE
OF THE ELECTRIC-LIGHT BATH.*

BY T. D. CROTHERS, M. D.,

Superintendent Walnut Lodge Hospital, Hartford, Conn.

The use of the electric-light bath as a sudorific and tonic or remedy for the restoration of deranged metabolism is practically new in therapeutics. A number of experimental studies have been made in this direction with most encouraging results. The sudorific action of electric light is prominent and evidently superior to the hot-air bath both in rapidity of action and duration of effect.

How far the electric-light bath promotes healthy metabolism, destroys bacteria, and adds new force or vigor to the functional activities of the body is yet to be determined. Hot-air baths in nearly all forms of neuro-psychoses have proved so valuable that farther researches, with improved means and methods, give promise of most practical results.

The patients who come under my care suffer from the toxic insanities due to spirit- and drug-taking. They also suffer from sclerotic conditions of the heart, liver, kidney, and blood-vessels, particularly of the finer arterioles. Associated with these pathological changes are various degrees of vasomotor paralysis, organic cell changes with disturbances and palsies of co-ordination. Anæmia, hyperanæmia of the nervous system, and the unknown conditions described by the terms neurasthenia and cerebrasthenia are always more or less prominent. As a remedy for these conditions I have used the electric-light bath for over a year, giving from thirty to fifty baths a week, exclusively to spirit- and drug-takers in all conditions and degrees of addiction. The bath consists of a room five feet square and six feet high, lined with tin, on which are arranged ninety incandescent lights of sixteen-candle power. The patient taking a bath sits on a chair in the center of this room with the entire body exposed to the light, the head being covered by a napkin.

It was found from experience that the action of the electric light dried out the oil in the hair, leaving it dry and

* Read before the American Electro-Therapeutic Association, September 3, 1902.

husky, hence it was thought that the intense action of light would impair the growth of the hair and otherwise injure the scalp. These effects were not noticed on the hair of other parts of the body. At the beginning of the bath the temperature of the room would be about 70° F., and in the course of ten or fifteen minutes it would rise to 125° or 130°, and during the one or two hours in which the baths were given it would fluctuate between 120° and 150°. The opening of the door for the exit and entrance of a new patient would vary the temperature from ten to fifteen degrees. Perspiration began after entrance to this room in from five to eight minutes, and became very profuse in from ten to fifteen minutes, the patient rarely remaining over fifteen minutes.

In most cases the duration of treatment was but ten minutes, sometimes less. Many persons perspired excessively in five or six minutes. This depended in some measure on the state of the skin. As all patients of this class have general anæsthesia of the cutaneous nerves and diminished circulation of the superficial vessels, diaphoresis is always lessened and impaired. In some instances profuse perspiration would appear in a few minutes, in others it would be slow. For the purpose of aiding this action quantities of water were drunk before entering the bath. The first inquiry was as to the effect on the temperature of the body. Where the temperature was above the average, due to some toxins or some subacute inflammatory condition, there was a sharp fall of from one to two degrees, and in some instances this occurred during ten or fifteen minutes. This reduced temperature usually continued for hours or days after, and in some instances did not rise again. In other cases where the temperature was subnormal, due to unknown conditions, there was a slight rise of a degree or more.

In both these classes it was supposed that the fluctuation in the temperature was due to the removal of the toxæmias. In other examples the temperature did not vary much and quickly dropped back to the condition which existed at the beginning of the bath. In the so-called tobacco heart, a condition noted by much functional disturbance, of which tachycardia and arrhythmia are the most common phases, the effects were noticeable in diminishing the irregularity, giving

tone and strength to the pulse. In most cases the heart's action increased from ten to fifteen beats, and the regularity and force of the beat was improved, and this increased action continued for hours afterward. Where organic disease of the walls or valves existed, a marked improvement followed, particularly in the regularity and steadiness of the beat.

The respiration remained about the same, in some instances rising, in others falling. In all, it improved in steadiness and uniformity. It should be mentioned that, after the bath, massage with hot or cold showers were given and the patient always retired to bed, the baths being given early in the evening. This would supplement and increase the good effects of the light or neutralize any possible bad effects from it.

It is evident that two distinct effects were produced from the action of electric light in this form. First, the physiological effect. The rapid, sudoriferous action of electric light on the skin produced intense and rapid elimination, draining off the water from the blood and tissues and with it the toxins, salts, and excrementitious matters. This in itself is a most valuable means for relieving the disordered conditions commonly present. It was found that after this sudorific effect, followed by massage and shower, a decided soporific tendency was induced. Degrees of nervous insomnia were overcome, and persons who could not sleep well before the bath after it had profound slumber. Drug-takers, who were constantly looking for the analgesic effects of drugs, found in the bath the relief they sought. In some instances this was very marked, and lasted for one or two nights. In others it was of short duration. In all instances it was a marked result. The particular disorders which seemed most influenced by the bath were neuritis, gastritis, myalgia, and extreme nervous irritation.

Arterio-sclerosis—a very common organic disease in spirit- and drug-takers—is materially changed by the light bath, as seen in the improvement of the heart's action and lowering of the arterial tension. After each bath the circulation becomes steadier, and the tracings by the sphygmograph more uniform. The general sclerotic condition is changed, in one instance the patient lost flesh and gained in muscular vigor. He became intensely alarmed at his condition, and

has used the light bath every day for three months with marked changes.

Sclerosis of the liver and kidneys have greatly diminished in several cases and the acute symptoms subsided through the use of the bath. In hypertrophic liver the size of the organ is perceptibly decreased after the first bath. Albumin and casts from the kidneys grow less and finally disappear after a few baths.

All these and other conditions show marked improvements from the time of the first bath. This was so prominent in some instances that all drug medication was withheld and the baths were the exclusive remedy used for the time. It was evident that the electric light was the most prominent agent in producing these results, supplemented by the massage and showers. This was proved in instances where the electric bath was not used, but only massage and showers, in the different effects which followed.

It was also evident in persons who daily took hot-air baths with massage and showers. A comparison of results, including the rapidity of restoration, showed that those who took the electric-light bath made a more rapid recovery, slept better, and the nutrition improved with greater rapidity.

Second, the psychological effect was especially marked. The first impression of an electric-light bath is always pleasant, because associated with a feeling of credulity as to the effects. The impressiveness of the room and the absence of any unpleasant physical conditions, such as the glare of light on the eyes or the discomfort of breathing, with the feeling of awe and wonderment aided by the suggestions of the operator, have a very powerful influence on the mind and body. After the first bath this confidence is deepened and the mental suggestion of restoration from this means becomes a dominant idea, which, in addition to the physical agents used, is a most powerful tonic and restorative.

A certain hypnotic impression grows with each bath and is very largely supplemented by the actual physiological action of light on the organism. As a result, mental disturbances of all degrees, including illusions, delusions, and hallucinations grow less and less, and finally disappear. It is evident that its use in manias and melancholias might be very

beneficial, also that in marked organic diseases it will be of great value in staying the progress of the disease.

In many cases an intense mental disgust for spirits follows the bath. This grows with the vigor of the person. The exhaustion not unfrequently noted after a hot-air bath never follows the electric bath. This is, no doubt, due to both mental and physical influences.

These are only a few of the many indications which are traceable to the use of light. I am encouraged to believe that with new methods of application and a wider and more accurate study, its value as a therapeutic agent will come into great prominence.

DISCUSSION.

Dr. C. E. Skinner said that the paper was very interesting to him, and he wished observations had been made on the blood and on the elimination of urea. He had found that local hot-air baths of special construction caused a leucocytosis of fifteen to fifty per cent., and the elimination of from five to twenty-five per cent., or more, of urea.

Dr. Crothers replied that he had not examined the blood with regard to leucocytosis, but he had found the elimination of urea to be invariably increased.

Dr. G. Betton Massey said that this interesting paper incidentally illustrated the fact that Dr. Crothers should have been at the meetings before, because as long ago as 1894 this subject had been discussed by Dr. T. H. Kellogg, of Battle Creek. He thought it well to adopt the term used by Dr. Kellogg—radiant heat bath.

Dr. D. R. Brower asked how Dr. Crothers ventilated his bath.

Dr. W. B. Snow said that he had had constructed a similar bath, but he had not been satisfied with many features of the apparatus. He was convinced that the glass bulbs of the electric lights cut off a good deal of the therapeutic effect of the light. Finsen and others in Europe, and Drs. Freudenthal and Cleaves, in this country, had been investigating this subject scientifically, and from their researches, if we are to obtain other valuable actions than the effect of the heat, these methods must be modified. With the apparatus employed by Dr. Crothers the therapeutic effects were evidently largely due to heat. Light as a therapeutic agent had a great value, and the therapeutic value of heat was acknowledged, but if the latter were to be used, then, he thought, higher temperatures should be used. Dr. Sigismund Cohn of New York city had recently had constructed a bath with

eight arc lights of several hundred candle power each. The patient sits with the head protruding from the top of the bath. The temperature becomes very high, and he was disposed to believe that the light effect was better because of the elimination of the glass.

Dr. Robert Newman said that the Association had an excellent standing committee on electric light, and he had hoped the committee would present a valuable and exhaustive report giving the experience of a whole year with this new field. This treatment was nothing more than an imitation of the effect of the sun, and it was well known that life could not be sustained without the sun. By restoring the eliminative functions of the body by the application of light and heat much could be done to combat disease and restore persons to health. The special hot-air apparatus employed by Dr. Skinner would certainly make anyone perspire, whether he wanted to or not. He believed the electric light was destined to play an important part in our therapeutics.

Dr. M. M. Johnson of Hartford said that he had followed with some interest the work done by Dr. Crothers, and he was convinced that the treatment differed materially from simple hot rooms. As the patient sat in the bath, opposite each of the lights one observed a little spot on the skin; hence, the effect on the cutaneous and nervous systems was entirely different from that obtained by the hot room, such as is used in connection with the Turkish bath. This special action deserved further study, for, that the action was a special and peculiar one had been proved by the different results obtained with the simple hot-air bath and with the electric light bath.

Dr. W. B. Snow asked for more information as to the arrangement of the electric lights.

Dr. Charles O Files said that nothing had been said regarding the use of the electric light bath in tuberculous affections. In this class of cases it was necessary to have the whole person, including the head, within the bath. He had an electric light bath with two arc lights and thirty-five incandescent lamps arranged so that they could be used collectively or separately. He had found that in some tuberculous cases in which coughing was so incessant that sleep was almost impossible, the effect of the ozone, or of something else from the electric lights, promoted sleep very markedly, and also caused an increased amount of secretion. There was still much to be learned in this field, and baths, both with the head in and with the head outside of the bath, were useful, depending upon the class of cases under treatment.

Dr. J. D. Gibson said that he had used the arc-light bath for several years, for the most part in cases of tuberculosis. He had been deeply interested in the reports from the dif-

ferent fields covered by Dr. Crothers' paper. He preferred the arc-light bath ordinarily, because of the ozone, and he was under the impression that Dr. Kellogg had changed from the incandescent- to the arc-light bath. He himself used arc lights of eight-thousand candle power in a room measuring 16 1-2 by 6 by 8 feet. This produces considerable heating and such an intense light that the eyes must be protected by rubber or some similar means. One patient before the bath treatment was receiving one-quarter of a grain of morphine, twice daily, in order to secure any rest from the incessant coughing of an advanced pulmonary tuberculosis. After the arc-light bath treatment was begun no morphine was required, and the patient made rapid progress.

Dr. Robert Reyburn said that some recent investigations had been made concerning the transparency of the body to ordinary light. In the Medical Record there had been published about one year ago a paper describing the taking of photographs directly through the human body. While we all knew the effect of the sun's rays, it was not generally appreciated how transparent the human body is to these rays.

Dr. Crothers closed the discussion. He said that he had an opening in the top and another in the bottom of the door of the bathroom to secure ventilation. There had been no difficulty in securing proper ventilation because the patient only remained in the bath a few minutes, and the electric lights did not consume the air. The lights were only arranged so as to most conveniently diffuse the light. He had been told that the arc light was stimulating and irritant, and that the incandescent light was not so, and hence he had used the incandescent light. He had had no experience with the arc light. The tendency of the light was to quiet the nervous system and produce sleep. Although his experience had been in a special field he felt convinced that the electric light bath was capable of doing good in a much wider sphere. When there was any hyperæsthetic condition of the body the affected part became intensely red under the action of the light. The patients did not care to remain longer than ten minutes in spite of the soothing action, as they seemed to then become restless under the profuse perspiration. For a day following the bath there was a feeling of distinct exhilaration and contentment. The simplicity, harmlessness, and potency of the treatment certainly commended it to all physicians. He believed it was far better to have the whole body exposed to the light, and the latter in close proximity to the body.

REPORT OF THE COMMITTEE ON CURRENT CLASSIFICATION AND NOMENCLATURE.*

NEW YORK CITY, September 3, 1902.

Chairman of the Executive Committee, American Electro-Therapeutic Association.

Dear Sir: The special committee chosen at the meeting of September, 1901, to investigate the nature of the currents used in medical practice, begs to submit the following partial report and to suggest that if, in view of the work thus far done, the Association desires that the investigation be carried out as originally proposed, the present committee be continued.

Your committee encountered at the outset the difficulty of attempting to deal with several varieties or manifestations of current with only limited information as to their effects upon the human system, and with no plan of adequate or appropriate terminology. Its members have therefore confined their efforts, during the few months since the committee has been made complete by the appointment of Professor Thomson, to the formulation of a scheme of nomenclature which is here submitted, subject to revision during the coming year, and in the hope that this first draft may be spread upon the printed transactions of the Association and otherwise published in such manner as to draw out the most general and intelligent criticism and suggestion both in this country and abroad.

The committee desires to acknowledge the cordial co-operation of Mr. Charles L. Clarke, Member A. I. E. E.

Respectfully submitted,

ELIHU THOMSON,	} Members of the
SAMUEL SHELDON.	
WILLIAM J. JENKS.	
	American Institute of
	Electrical Engineers.
	Committee.

NOTE :—In defining a current in accordance with the following classifications the adjectives are to be applied in the order in which the corresponding classifications are arranged. For example, the current set up in a circuit connected with the outside coatings of two Leyden jars, the inside coatings of which are connected with an alternating-current dynamo-electric generator (Section 6) is: (a), a dynamo current; (b), a static-induced current; (c), an alternating current, and, within the scope of the classifications, is fully defined by the expression *dynamo, static-induced, alternating current*. It should be carefully borne in

*Read before the American Electro-Therapeutic Association September 4, 1902.

mind that the adjectives under classifications I and II relate, respectively, to the electrical generating and modifying apparatus involved in the production of the current, and do not in any sense define the characteristics of the current itself, which are defined by the adjectives under classification III.

I.

Classification of Currents with Respect to Their Prime Electrical Source.

1. *Voltaic Current*.—A current primarily due to a voltaic battery, storage battery, or other electro-chemical source.
2. *Static Current*.—A current primarily due to an electro-static (influence), or frictional, machine.
3. *Dynamo Current*.—A current primarily due to a dynamo-electric machine, whether having permanent magnets or electro-magnets.
4. *Dynamo-Static Current*.—A current primarily due to a dynamo-static machine.
5. *Thermo Current*.—A current primarily due to a thermo-battery (thermo-pile).

II.

Classification of Currents with Respect to Secondary Electrical Generating or Modifying Apparatus.

6. *Induced Current*.—A current derived from another current by means of either magnetic induction or static induction. A current produced by magnetic induction is a *magnetic-induced* current, such, for example, as the current produced in a circuit connected with the secondary of a so-called Rhumkorff, or "spark" coil, or with the secondary of a static transformer as employed in alternating-current systems for electric light and power distribution. Either of these currents may be termed a *secondary-induced* current. The momentary current of high pressure (electro-motive force) induced in the primary of either apparatus while its circuit is being opened may be termed a *primary-induced* current. It is really a composite current, due in small measure to the persistence of the original current caused by the electro-motive force of the source to flow through the increasing resistance offered by the spark which bridges across the opening; and in much larger measure to the far higher electro-motive force due to the inductive action of the apparatus upon its own primary circuit, which is added to that

of the source. A current produced by static induction is a *static-induced* current, such, for example, as that produced in a circuit having its terminals respectively connected with the outside coatings of two Leyden jars, the inside coatings of which are connected, respectively, with the prime conductors of an electro-static machine, the latter being so adjusted that sparks or disruptive discharges pass between them. Or the inside coatings of the jars may be connected with the terminals of an alternating-current dynamo-electric machine.

A current due to the combined action of a Rhumkorff (induction) coil and a condenser connected with the terminals of its secondary, may be properly called a *magnetic-induced-condenser* current.

7. *Reaction Current*.—A current in a circuit, branched from another circuit, and modified in its strength or phase by the electro-magnetic induction of the current in the latter of the two circuits reacting upon itself (reactance or self-induction) or from the electro-static influence of the latter current upon itself (condensance). A reaction current will be produced in a circuit connected with the terminals of a coil having an iron core (called a "choke" coil), or with the terminals of a condenser, when the terminals of either are also connected with a prime source of alternating, or variable, currents, such for example as an alternating-current dynamo-electric machine, or a battery having a current interrupter in its circuit. A reaction current may be produced in a circuit by connecting it with the terminals of the primary of a Rhumkorff coil. Or such a current may be produced by connecting it with the two ends of a vacuum tube in operation, which may be considered as a condenser the dielectric of which is repeatedly and rapidly ruptured with a resulting rapid and continual variation in the strength of the current flowing through the tube.

8. *Shunted Current*.—A current divided or branched from another current by means of a resistance which is opposed to the flow of the latter. A shunted current may be produced in a circuit by connecting its ends, respectively, with the terminals of a resistance coil (which is generally so constructed as to practically possess no self-induction), the latter being also connected with the source. Under these condi-

tions the circuit in question and the resistance coil are said to be connected in multiple arc with each other. A shunted current will be produced even if a current interrupter is placed in circuit with the resistance, either between or outside the terminals of the latter, or if a current-disruptive effect is brought about by the nature of the materials from which the resistance is made or its form of construction.

III.

Classification of Currents with Respect to Direction of Flow, Variation in Strength, and Time.

9. *Direct Current*.—A uni-directional current, that is to say, a current which flows in one direction only. But a direct current may fluctuate in strength in any way between a zero value and any maximum value, only it must never flow in an opposite direction. Fig. 1 is a diagrammatical representa-

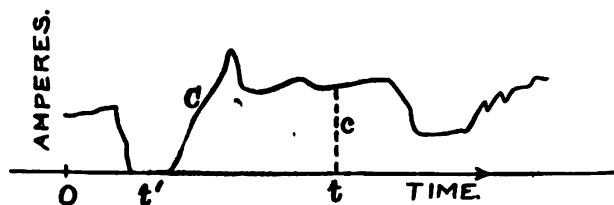


Fig. 1.

tion of a direct current C , the strength of which, in amperes, at any instant t , as measured from 0 along the horizontal line of time, is denoted by the length of the vertical line c . The horizontal line is also the zero line of current strength. Galvanic and storage batteries, electro-static machines, dynamos provided with a suitable commutator, and thermopiles are some of the generators of direct currents.

10. *Continuous Current*.—A direct current which continually maintains its flow; or, in other words, a current that flows continually, and in one direction, and at no time has a zero value. In Fig. 2, C represents a continuous current which, however, is shown as varying in strength from time to time. Note that the direct current C , as shown in Fig. 1, is not a continuous current for the reason that at the time t' it has

a zero value; in other words, there is then no current. If the strength of a continuous current remains unchanged it is termed a *constant* current. Such a current is represented by the horizontal dotted straight line C' in Fig. 2. Batteries,

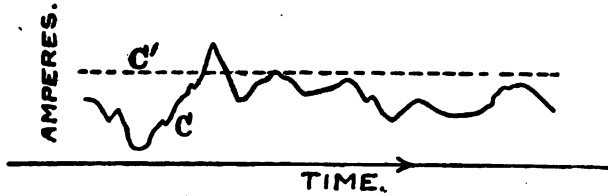


Fig. 2

and dynamos with commutators, are the means commonly employed for generating *continuous* currents and also *constant* currents.

II. *Pulsating Current*.—A direct current the strength of which varies between a maximum and minimum value in repeated cycles, and each time in substantially the same manner. Fig. 3 represents a form of pulsating current, and



Fig. 3.

approximately such a one as is generated in a circuit connected with a battery, or with a Gramme or Siemens continuous current dynamo, when some suitable form of circuit-breaker therein is alternately opened and closed at a comparatively slow rate, and the circuit also has considerable self-induction, due to coils of wire therein, or to its being of considerable length. Note that the minimum strength of the current is zero. By operating the circuit-breaker at a still slower rate, the time during which the current has a zero value will be lengthened and its maximum value will be increased. If it be operated at a very rapid rate the minimum

strength of the current will be greater than zero, and its maximum value less than before. In this case, the circuit having self-induction, the circuit-breaker fails to break the circuit completely, because for the short interval of time during which the contact points of the breaker are separated, the integrity of the circuit is preserved by the spark between

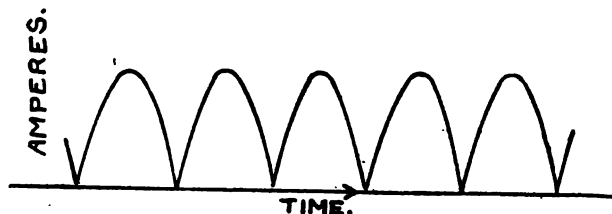


Fig. 4.

them, and through it the current continues to flow. It is assumed that there is no condenser or Leyden jar in the circuit.

Fig. 4 shows the character of the pulsating current which flows in a circuit connected with the armature of a 2-pole dynamo having a single generating coil, and a 2-part commutator for sending the currents into the circuit in the same direction, provided the circuit, including the dynamo, has no

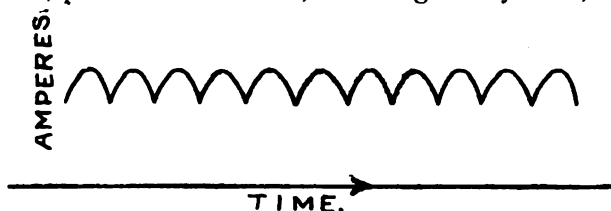


Fig. 5.

appreciable self-induction. With self-induction present the current-curve, instead of forming a sharp point at the zero-line, will be more or less rounded.

If the armature is wound with two coils and has a 4-part commutator the pulsating current will be substantially of the character shown in Fig. 5, the lower parts of the curve meeting in a point, as shown, when the circuit is without self-induction, but rounding when self-induction is present.

But by sufficiently increasing the number of armature

coils and commutator segments the pulsations of the current will become so small as to be practically obliterated, and it then becomes a constant current, as shown by the line C' in Fig. 2.

12. *Alternating Current*.—A current which periodically flows in opposite directions, and in both directions for the same length of time, and whose variations in strength when flowing in either direction take place in the same manner and are equal in amount. When the current has passed from a zero to a maximum value in one direction, then again to

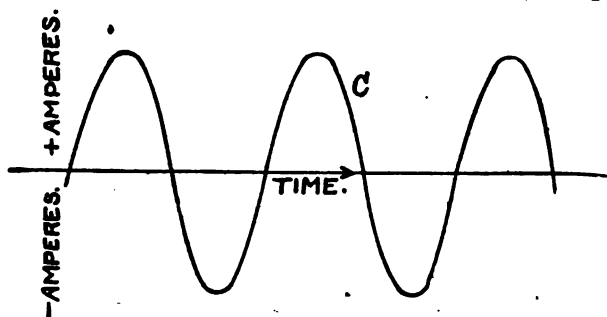


FIG. 6.

zero and on to the same maximum value in the opposite direction, and again to zero, it is said to have completed a *cycle*. The number of cycles gone through in one second is termed the *frequency* of the current.

Alternating currents are generated by dynamo-electric machines, the armature coils of which are not provided with commutators, but are connected, when the coils are stationary, directly with the external circuit; or, when the coils rotate, with the external circuit through slip-rings and collector-springs.

Some types of dynamos generate alternating currents very regular in form, as shown in Fig. 6, in which C represents a so-called *sine-wave* current, that is to say, a current having a pure-wave form, without overtones. The direction in which the current flows at any time is indicated in the diagram by the position of the curve C with respect to the horizontal zero line. During the time C is above the line the current is to be understood as flowing in one direction, and as flowing in the opposite direction when below the line. Substantially such a current is generated by the so-called "sinusoidal

machine," which is one form of alternating-current dynamo. On the other hand, the construction of a dynamo may be such that the curve of its current varies widely from the sine-wave form, as, for example, the alternating-current curve in

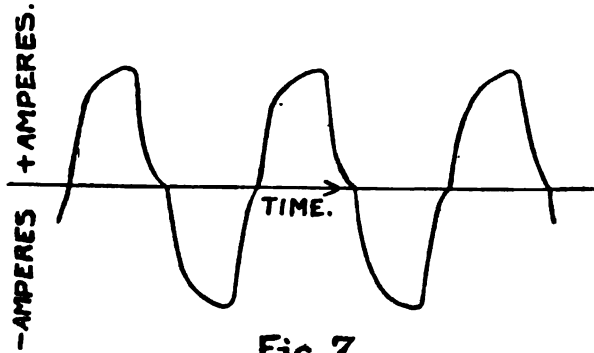


Fig. 7.

Fig. 7. It will be observed, however, that the curve is symmetrical on both sides of the zero line.

The forms which the alternating current wave may be made to assume are almost numberless.

13. *Oscillating Current.*—A current which periodically flows in opposite directions, but not necessarily in both directions for the same length of time, and in which the maximum values, or amplitudes, of successive waves (irrespective of the direction of flow) change in regular order. In an oscillating current of so-called pure sine-wave form the current flows in successively opposite directions for the same length of time, and the amplitudes of successive waves bear to each other a constant ratio; that is, so vary that from beginning to end of the oscillations each following amplitude bears the same ratio to the next preceding amplitude. Fig. 8 represents an oscillating current of pure sine-wave form consisting of a series of waves of constant length, decreasing in amplitude, or strength, in constant proportion.

Oscillating currents of sensible duration, and of the character shown in Fig. 8, may be produced in a circuit by connecting its ends with the outer and inner coatings, respectively, of a charged Leyden jar, or the terminals of a charged condenser, having a comparatively large capacity, or by connecting an uncharged jar or condenser with a voltaic battery or continuous-current dynamo. The current from a light-

ning stroke is supposed to be frequently oscillatory; and in many cases the enormous condenser "capacity" of clouds and earth, and the extremely high resistance of the spark-path,

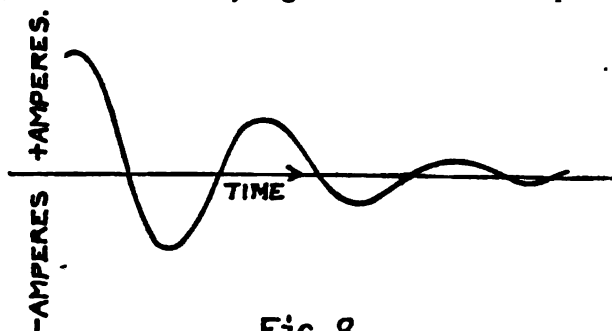


FIG. 8.

must make the oscillations relatively very slow. The higher the potential to which the jar or condenser is charged the greater will be the amplitude, or strength, of the oscillations. Whatever oscillatory effect is imparted to a current is primarily due to the capacity in the circuit.

14. *Unsymmetrical-Wave Current.*—A current which periodically flows in opposite directions, and in the same direction for the same length of time, and whose variations in strength when flowing in the same direction take place in the same manner and are equal in amount, but whose maximum value when flowing in one direction is different from its maximum

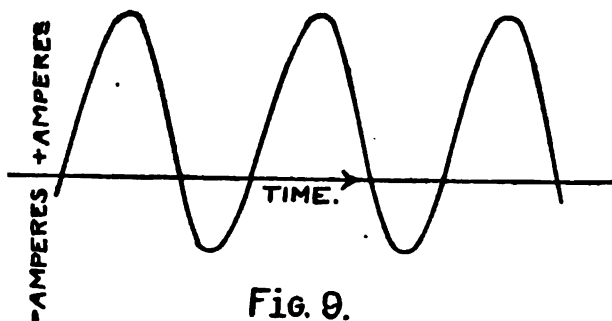


FIG. 9.

value when flowing in the opposite direction. Fig. 9 shows a simple form of unsymmetrical-wave current, substantially such, for example, as may be produced by connecting a battery, or a continuous-current dynamo, in series with an alternating-current dynamo.

CLINICAL HISTORY AND PROGRESS OF A CASE OF PULMONARY DISEASE TREATED EXCLUSIVELY BY MECHANICAL VIBRATORY STIMULATION.*

BY MAURICE F. PILGRIM, M. D.

First Vice-President of the American Electro-Therapeutic Association; Professor of Psychiatry in the New York School of Physical Therapeutics; Member of the International Metaphysical Society.

A new clinic was put into operation in The New York School of Physical Therapeutics on October 1 of this year, for the treatment of disease by Mechanical Vibratory Stimulation. A large number of cases have been treated during the past two months. Treatment was not restricted to any particular group or class of diseases. Whenever a case was presented in which this treatment, either as primary or adjunct, was indicated, it was applied.

Among the diseases treated there have been several cases of pulmonary affections, and while all of them have shown gratifying improvement almost from the start, it is deeply to be regretted that only one of them is available for report in detail at the present time. Clinics are maintained, as we all know, for the double purpose of treating the sick who are unable to pay regular fees, and for the scientific study of disease under various methods of treatment. Everyone who has had much experience in conducting a clinic for "out-department" patients, knows how difficult it is to satisfactorily accomplish the purpose last named. The ambulatory character of this work makes it impossible to secure regularity of attendance. Directions as to diet and habits of living cannot be here enforced as when patients are in the wards of a hospital. The clinical records of cases treated under such conditions cannot be relied upon to do much credit to any system of treatment.

The case which it is now proposed to report was an exception. The patient came regularly for treatment and in every way endeavored to faithfully carry out instructions. Except for one omission, which is as regrettable as it is serious, this was an ideal case for the purpose of observing and studying

* Read before the Clinical Society of The New York School of Physical Therapeutics, December 19, 1902.

the effects of mechanical vibratory stimulation in tubercular disease of the lungs. Every important fact obtainable from the patient both as to heredity and herself was recorded, and a most careful and thorough physical examination was made and repeated from time to time. Some weeks later, and when improvement was well advanced, it was discovered that no microscopic examination of the sputum had been made. It was also discovered that the patient did not have the record of such an examination under previous treatment, although informed that her case was tubercular in character. Here was a case presenting every physical indication of tubercular disease of the lungs, as the following record will show; it had been given a most unfavorable prognosis before coming to us; and under vibratory treatment made a most remarkable recovery. Nevertheless, because of the prevalent belief that a microscopic examination alone can infallibly establish the diagnosis of pulmonary tuberculosis, this case is presented as one of "pulmonary disease" simply. Individual judgment must, therefore, determine the precise character of the affection. Inasmuch as the patient had been obliged to give up her employment, was losing flesh and rapidly growing weaker, if her affection were not pulmonary tuberculosis, it was pulmonary disease quite as bad and running as swift a course. After all, is not the *name* of the disease that was carrying a patient unerringly deathward, of less consequence than the fact that the morbid process was arrested and life was saved? That, so far as finite wisdom could forecast, was this case and the following is its clinical history:

October 6, Miss M., age twenty-seven. Both father and mother died of "consumption" before reaching middle life; also a sister, two years her senior.

Inspection.—Marked infra-clavicular depression on right side. Impaired mobility of upper part of lung. Chest flattened. Shoulder depressed.

Percussion.—Very marked dullness over right lung, beginning at clavicle and extending downward and involving fully one-third of the lung, with almost total loss of resonance.

Auscultation.—Diminution of vesicular murmur with moist râles of a consonating character. Inspiratory murmur

irregular and jerky; expiratory murmur loud and prolonged; exaggerated vocal fremitus.

Pulse rapid and irregular.

Temperature elevated.

Breathing shallow and distressing.

Cough very frequent and exhausting, with profuse frothy sputum.

Night sweats not very frequent. Appetite very poor and digestion much impaired. Stomach unable longer to retain emulsions of cod-liver oil or expectorants.

Weight, 118 pounds. Patient very languid, any unusual exertion causing dyspnoea and rapid heart action; face pale, lips dry and almost colorless.

Patient was treated on alternate days. Because of the impaired condition of the digestive organs, it was not deemed best to give her emulsions, prepared foods, or drugs. She was treated by mechanical stimulation only. It was applied for its general tonic effect, first to the entire length of the spinal column, the rubber ball being deeply pressed into the spaces between the transverse processes so as to strongly stimulate the nerves given off at these points. Stimulation, designed to increase the circulation in the lung and improve nutrition; was applied to the nerves of the cord given off from the second to the eighth dorsal on the affected side. This is the vasomotor center for the thorax. For the purpose of stimulating drainage and so favoring excretion, the brush attachment was applied to the axillary glands, the liver, and spleen. Increased nutrition and metabolism was attempted through deep pressure over and stimulation of the solar plexus, which at the same time imparted tone to the stomach. This, with unimportant variations, constituted the treatment—the *sole* treatment—for a period of over two months. Here is the record:

October 8.—Cough less frequent and not so "tight." Appetite and digestion improved. Feels better.

October 13.—Distress in breathing greatly relieved. Appetite and digestion still improving. Cough much less. Pulse less rapid and of better character.

October 20.—Normal temperature. Pulse, cough, appetite, and digestion still improving. Less dyspnoea on exertion. Physical signs in affected lung practically unchanged.

October 30.—Cough slightly worse. Patient has taken cold, otherwise conditions unchanged. Temperature and pulse normal

November 1.—Cough greatly improved. Has recovered quickly from the effects of the cold. Appetite and digestion still satisfactory. Weight, 123 pounds—a gain of five pounds. Less râles and more resonance.

November 10.—Improvement already noted still continues. Marked improvement in physical signs. Râles fewer and at considerable intervals. Breathes deeply without pain or distress. Color is returning to lips and face and is growing steadily stronger. Normal pulse and temperature.

November 20.—General improvement continued. No râles. Infra-clavicular region much less dull. Inspiratory murmur has become normal. Patient is eating, digesting, and sleeping well, and is not "nervous any more." Cough and expectoration now very slight.

November 30.—Gradual improvement continues, weight increased to 127 pounds. Patient says she feels well and strong, and her general appearance corroborates her statement.

December 3.—Patient reports that she has resumed work, that she feels as well as she ever has at any time. Cough is gone. Appetite and digestion good. Of the physical signs in previously affected lung, nothing now remains except slight infra-clavicular depression—no râles, character of breathing entirely normal.

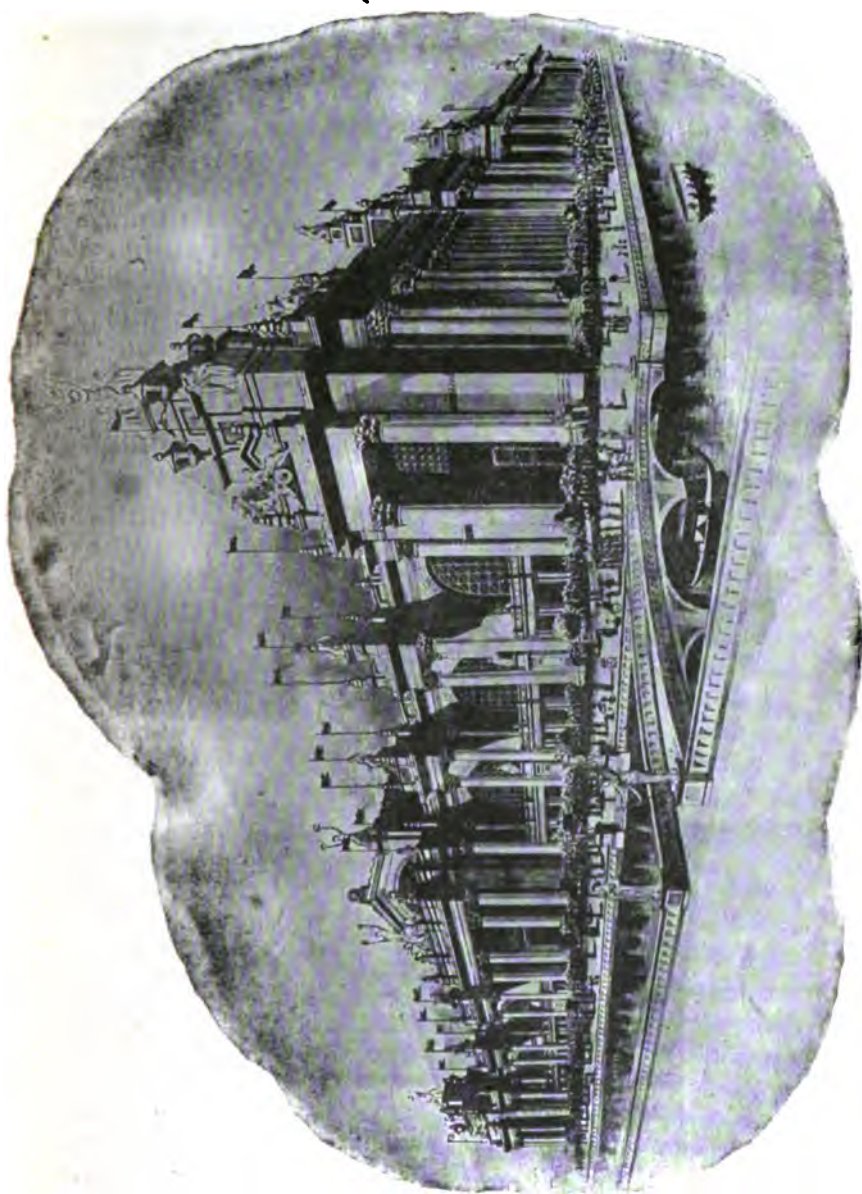
Patient says she has not taken a dose of medicine of any kind since commencing the vibratory stimulation treatment more than two months ago.

In concluding this brief résumé, attention is especially invited to the prompt improvement in the digestive and assimilative functions as the result of treatment. This result has followed in every case of pulmonary disease thus far treated. We all know only too well what might be done for our phthisical patients if nutrition could be maintained. But it is usually the sadly familiar story of a stomach too enfeebled to respond to any treatment and the patient perishing in consequence. If subsequent experiments shall establish the fact that mechanical vibratory stimulation may be relied upon in even a fair percentage of cases to maintain at normal standard the functions of digestion and assimilation, an important forward step will have been taken in the direction of the successful treatment of pulmonary disease. It is certainly worthy of and deserves the serious consideration and investigation of the profession at large.

THE ELECTRICITY BUILDING OF THE UNIVERSAL EXPOSITION OF ST. LOUIS, U. S. A., 1904.

The electricity building of the Universal Exposition of St. Louis, 1904, is the largest ever provided, by an exposition or otherwise, for electrical exhibits and displays. It covers virtually 300,000 square feet of ground space as against 250,000 covered by the electricity building at the Columbian Exposition at Chicago in 1893, and 75,000 by the electricity building at the Pan-American at Buffalo in 1901. It is of most graceful design and proportions, forming an elaborate pentagon, each of its five sides presenting a succession of splendid columns after the richest Corinthian order, four sides being surrounded by a balcony of rare grace and beauty. It incloses an open central circular court surrounded by rich colonnades, which will be banked with masses of flowers and make a pleasing retreat for visitors to the building.

Its location within the Exposition grounds is most favorable. It rises right at the foot of the grand terrace and cascades and thus constitutes a prominent feature of the main arrangement of the rich section which is called the main picture of the Exposition. The eastern exposure of the building fronts 525 feet on the main avenue of the Exposition. This broad thoroughfare leads up from the main entrance to the grand basin and cascades and is penetrated by the central lagoon. The southern exposure, facing the grand basin and the cascades, is in direct view of the electric fountains, the peristyle of the festival hall, and the splendid fine arts palaces. On the west and north the building is bordered by other principal avenues of the Exposition and additional extended arms of the lagoon. It is therefore completely surrounded by water. It is led up to by splendid arch bridges which will discharge the crowds into the broad avenues directly surrounding the building. Four main entrances are provided, one imposing portal at the meeting of the two north façades and one at the center of each of the other sides. Graceful and ample entrances are also provided at the corners of the building. The doors are of gigantic dimensions, 11 x 18 feet. The north façades of the



The Electricity Building of the Universal Exposition of St. Louis, U. S. A., 1904.

building measure 600 feet, which makes its greater dimensions 525 x 600 feet; 176 trusses and 185 tons of steel have been used in its construction.

The details of the building are exquisite and well executed in every respect. The columns supporting and adorning the sides are carried down close to the ground to give height and effect to the façades. The façades are accentuated by elevated pediments and tower effects which rise over the four main entrances and at the corners. For variation, a twin-column treatment is provided at different intervals along the sides, and over these, as well as over the elaborated entrances and corners, opportunity for ample sculptural decoration is supplied.

The fenestration of the building is bold, liberal, and appropriate, giving ample light, while affording substantial wall treatment. On two sides graceful and capacious loggias have been extended which enhance the general beauty of the façades, offering pleasing effects of light and shadow. A rare scheme of indirect illumination is being worked out and will be applied to the building, which will accentuate its beauty at night.

The design of the building and its general and special proportions and arrangement are peculiarly adapted for an effective display of exhibits. There are numerous openings in the façades, such as exhibitors seek in selecting their exhibit spaces. Each of the 300,000 feet of floor space is directly available. It is all advantageously situated, being compact, symmetrical, well lighted, well distributed according to aisles and entrances, and well provided with all conveniences. Most important of all, it is all ground-floor space, there being not a foot of gallery space in the building nor in any other exhibit building of the Exposition, a feature of the electricity building and of the Universal Exposition that will be welcomed and appreciated by exhibitors and public alike.

The department of electricity is bending its best energies to the development of the electro-therapeutic exhibits. Already a number of the most prominent manufacturers have expressed their intention of exhibiting on a very much larger and more comprehensive scale than ever before, and the outlook is very promising.

The electro-therapeutic apparatus will in so far as possible be shown in operation. Special provision will be made for ready and successful means of exploiting the performance of static machines and X-ray outfits, and for showing the use, adaptability, and value of electrodes, ozone generators, transformers, cabinets, measuring instruments, and other important accessories. Recent advances in electro-therapeutics lie chiefly along the lines of the use of high-potential currents of high frequency, and a special attempt will be made to put on exhibition all of the modern methods of administering such currents. This will include the various forms of oscillators and resonators.

The Electro-Therapeutic Association not only passed resolutions commending a hearty co-operation with the Exposition on the part of all those interested in the manufacture and use of electro-therapeutic apparatus, but also appointed a committee to assist the chief of the department of electricity in bringing about a successful organization of the exhibits in this department. This committee is now engaged in doing very thorough and conscientious work and marked progress is being made in stimulating widespread interest. A member of the committee, after apprising himself with reference to the great magnitude and scope of the Exposition and the unusually complete organization of the work, has expressed the opinion that the plans thus far made for the electro-therapeutic exhibit in the electricity building, it would seem, cannot fail to meet the convenience and approval of the membership of the Electro-Therapeutic Association, and that he will do his best to strengthen the efforts of the electrical department to make the electro-therapeutic exhibits a marked success. It is the intention to give electro-therapeutics a prominent location among the electrical exhibits and to place them amid surroundings that will adequately mark the important sphere dominated by this branch of electricity.

Editorial.

PROGRESSIVE MEANS FOR THE RELIEF OF PAIN.

THE relief of pain has been the physician's *bête noir* in all generations. It has made friends and allies which have won knighthoods and the recognition and appreciation of suffering humanity. Until recent times the agencies which have found universal professional favor in the effort to relieve pain have been the knife, anæsthetics, heat, cold, anodynes, and narcotic drugs. The same agencies will ever find place as measures to be considered, but with advancing time means are being constantly developed and improved which better meet the conditions causing pain, thereby effecting in a large variety of cases results which have defied the older methods. The employment of electricity of great voltage and a quantity so small that the element of danger is eliminated; the employment of dry hot air at temperatures that could not be borne under conditions where moisture was present; the systematic employment of mechanical vibration, making use of machines constructed for the purpose; and the application of the X-ray to therapeutics open new fields of possibilities.

Pain may be produced by applying stimulation to a nerve in any part of its course, but the sensation is as a rule referred to the peripheral end of the nerve in accordance with the "law of the peripheral reference of sensations." This fact makes necessary the careful diagnosis of the site of the lesion if the method of treatment is to succeed. Every kind of stimulation, whether electrical, thermal, mechanical, chemical, or somatic (inflammation or disturbance of nutrition), will under certain conditions cause pain.

The character of the stimulation causing the pain will determine the method of treatment to be adopted. Mechanical conditions may be divided into two classes—those arising from the blood pressure associated with inflammatory action, and those in which the object of pressure is some foreign substance or chemical product within the system, as renal and biliary calculi. For the latter, surgical measures and morphine or other anodynes will always be indicated; while,

on the other hand, mechanical pressure due to engorgement and stasis will be successfully treated and pain relieved by one or another of the methods referred to above; for, high-potential electricity, vibration, and the X-ray, as is shown by recent experience, will generally prove effective.

The pains of neuritis, neuralgias of somatic origin, sprains, contusions, rheumatoid arthritis, and muscular contractions, are uniformly relieved by the scientific applications of high-potential electricity. Whenever a process of specific or microbic origin is present dry hot-air, the X-ray, or surgical interference will offer the greatest degree of relief.

Pain in the forms of malignant disease has been so successfully relieved by the X-ray that in all but exceptional cases when the administrations are possible its employment supplants the use of other anodynes. Experience so far has failed to demonstrate very favorable results in phthisis except in some instances from the employment of the X-ray in tubercular joint affections.

In gouty and rheumatic conditions, pneumonia, pleurisy, peritonitis, and septic affections, marked benefit and relief are obtained from dry hot air, employing temperatures of from 250° to 400° F.

The scientific use of mechanical vibration, which may properly be considered the latest and least tried of the applied therapeutic measures, promises to afford relief in a very large proportion of painful conditions. Indeed, the study of vibration and its application is a most interesting subject, and opens up a broad field of possibilities for the relief of pain and suffering: for indeed heat, light, and electricity are all forms of vibration.

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THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

IT is now a little more than a year since the idea was conceived of establishing a school in which physicians could attend clinics and obtain instruction in the various physical therapeutic methods not taught in the medical schools of the past, and in but few, if any, at the present time.

A house at 627 Lexington Avenue was leased, and two floors were equipped with the best apparatus to be procured, and in one year from a small beginning a large and successful clinic has been established. More than two hundred cases have been treated, including generally the class of conditions in which other methods utterly fail.

The use of electricity, which is taking an important place in therapeutics, is taught in the departments of gynecology, genito-urinary diseases, dermatology, diseases of the ear,

nose, and throat, and general and nervous diseases. The uses of the X-ray in the treatment of malignant and skin diseases, and in other conditions in which it has been demonstrated of value, is a feature of the work of the school in which great interest is centered at the present time. Two static machines and a coil afford facilities for caring for a large clinic in that department, and there are many who embrace the opportunity of receiving treatment there.

The use of dry hot air is a feature of great importance. A body and three limb-apparatuses are provided, with facilities for resting and after treatment, affording both students and the poor opportunities not to be had elsewhere. The department is in the hands of the leading authority on the subject.

Vibration is scientifically taught in a large and constantly growing clinic. The results obtained have been most satisfactory, and commend the method for more universal recognition.

The department of therapeutic exercise is in the hands of one of the best educators in this country. The value of systematic exercise as a therapeutic measure cannot be overestimated, and has therefore been given a prominent place in the school.

Dietetics and stomach diseases are in most competent hands, and have been deemed of sufficient importance to be given a place in the curriculum.

Psychiatry, while not properly a physical agent, has received so little attention in medical schools that it has been deemed best to add the important subject to the course of study. The chair is in competent hands and a clinic will be established at once.

Phototherapy, the most recent addition to the course, is certain to receive deserved attention. The apparatus is the most modern and powerful in use, and will best demonstrate the scope of this valuable method.

A Clinical Society connected with the school meets regularly on the third Friday evening of each month, at which papers, demonstrations, and discussions take place upon the various subjects in which the profession are invited to take part.

The school has already outgrown its present quarters, and needs facilities for accommodating a constantly growing clinic. The institution, like others of its sort, is a charitable one.

To the present time it has been supported largely from the donations of members of the faculty, whose services are gratuitous. The work and success of the school could be greatly enhanced if a hospital and larger space for operation were added, and we believe that the work justifies the hope that the additional opportunities will be afforded.

Progress in Physical Therapeutics.

GYNECOLOGY AND APPLIED METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D., PHILADELPHIA, PA.

ASSISTED BY MARY L. H. ARNOLD-SNOW, M. D., NEW YORK.

Some New Points in Electric Epilation. By G. Betton Massey, M. D.

That improvements in the technique of electric epilation deserve mention in a gynecologic section may not be apparent at first sight, yet the removal of superfluous hair from a woman's face has been known, in the writer's experience, to relieve the patient of evidences of melancholia. The work in this instance was therefore as truly gynecological as certain useless castrations, particularly when it is recalled that the latter often produce the mental condition so happily relieved in this case.

The first improvement suggested is that the platinum or gold needle employed should invariably be insulated. This is easily done after a little trial by heating the needle over a flame and bringing it into contact with a piece of burning hard rubber. The coating thus applied may be immediately reheated and made sufficiently smooth and tapering to permit of the needle being inserted as usual into the hair sheath, the tip only being bare. Such a coating will last only about a half hour, when it should be renewed. With such a needle epilation may be accomplished with a smaller current, less painfully, and absolutely without an after-scar.

The other point may not be novel, but patients readily testify to its value. This is the use of a drop of a saturated solution of cocaine placed by a pipette at the site of the first hair operated on, allowing the solution to penetrate the sheath during the operation on this hair by withdrawing the needle temporarily (with the current off) and reinserting it. The second application of the current is almost painless, and if this process is repeated at the four corners of an area of about two square centimeters, all the hairs within the area may be painlessly removed at one sitting if it is wise to do so.

Were it not for the fact that directions are frequently given by writers on this subject indicating their use of a chair for epilation, it would never have occurred to us that this work was done with the patient in a sitting position. Such a posi-

tion could not be other than trying to both patient and operator. The patient should lie comfortably on a couch with the head well up on the head rest, and the most effective position for the operator is to sit on a high seat behind the patient with an elbow on the head rest at each side of the patient's head.

In the November number of the *ADVANCED THERAPEUTICS* Dr. Massey claims that I do an injustice to the value of electricity in the treatment of fibroid tumors. The paper was read before the Suffolk District Medical Society, March 26, 1902, and published in full in the *Boston Medical and Surgical Journal*, August 7. In that I stated that at the time Dr. Apostoli's method was given to the profession the mortality was thirty-three per cent. (Ashurst) and in the work of Dr. Thomas Keith, published in 1889, "Uterine Tumors treated by Electricity," he shows how favorable the work of Dr. Apostoli was regarded, compared with surgery at *that* time. Many of Apostoli's pupils are among the famous gynecologists of to-day, some of whom, owing to the great advance in antiseptic surgery, have largely abandoned its use in many cases. In Cohen's "System of Physical Therapeutics," vol ii., the article "Electricity in Gynæcology," written by Dr. Martin, says: "Electricity is specially indicated:

"First, In bleeding fibroids in women approaching the menopause.

"Second, In all inoperable cases.

"Third, In incipient fibroids in women over forty years of age.

"Fourth, In all bleeding fibroids of the smooth interstitial variety without other symptoms than hemorrhage.

"Fifth, In all cases (not accompanied with pelvic pus accumulation) in which operation is refused."

Any of these cases, when treated by a competent electro-therapist, can be relieved and made comfortable without incurring the danger of a surgical operation. The great danger is that many of these patients get into the hands of incompetent persons who have had little or no experience with electricity in gynecology.

I believe, with Dr. Massey, that there is too much useless operating for *inflammations*; these can be as well relieved by electricity properly applied, and trust that Dr. Massey's idea of a "patient gynecologist with a training in electro-therapeutics" will help to remedy the mistake. About less mention being made in the French journals, I said it was "an old story" and that reports of treatments with high frequency and X-Ray had largely taken its place.

WALTER H. WHITE.

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The importance of keeping before the profession the full value of Apostoli's work in the treatment of fibroids is my only justification for tagging some remarks to the abstract of my friend Dr. White's paper. One may even stand upon a friend's shoulder if the battle for truth and humanity be the better fought.

And we must not misinterpret the apparent abandonment of electricity by certain skilled surgeons who first advocated it (and still use it probably) in America. It is possible that a love of their more brilliant work has had something to do with their neglect to write further of a slow and toilsome process. To the patient, however, the charm of surgical achievement is wanting, and she must face other questions that remain with her to the end of her days, even though the days be not shortened by the increased aseptic skill of the surgeon. For the loss of a pound or so of harmless flesh she barters her womanhood, at times her health, and often the integrity of her abdominal walls for the remainder of her life. These are no little things, and should be faced.

Dr. Martin's list, as drawn, leaves the exceptional cases for electricity. If drawn from the point of view of the electro-gynecologist only the exceptional cases would be referred to the surgeon.

G. BETTON MASSEY.

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LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

X-Ray in Laryngeal Cancer.

Delavan has not been able to find any absolute proof of the value of the X-ray in the fragmentary and meager reports which he reviewed, but there has been enough to suggest its value. (Med. Rec., October 18, 1902; Jour. Amer. Med. Assn., November 1, 1902.) In the answer to the question, should the X-ray be resorted to in laryngeal cancer, he says the victim of advanced laryngeal cancer should be allowed the benefit of it. In the early cases it is a question whether any time should be lost in experimenting. Still, where the progress of the disease is not rapid, and a few days would have to elapse before operation, it would be entirely justifiable to submit the patient to the treatment. What we need is a large series of carefully reported cases and lapse of time sufficient to prove that the treatment is of lasting suc-

cess. In conclusion, he reports a case treated for laryngeal cancer by the X-ray with about eighteen exposures, which seemed to be beneficial, but the patient shortly died of Bright's disease. From what was observed in the two weeks' treatment it seems that the patient would have been still further benefited had his general condition been more favorable.

Epithelioma of the Lower Eyelid Treated by the X-Rays.

Dr. Parham of New Orleans describes a case of epithelioma of the lower eyelid which had practically obliterated the lower eyelid and had worked its way up to the conjunctiva of the eyeball and around the outer canthus on to the upper lid, August, 1902. Exposures to the X-rays had been made at first at a distance of four inches from the node (target), later they were made closer. The average distance was three and a half inches. Exposures were made at first every day, but for the greater part of the time every other day, and occasionally several days intervened. The patient is now almost entirely well and has only a small ulcerated spot on the conjunctival surface of the lower lid. This result is far better than any surgical operation could have accomplished.

Dr. Parham laid stress upon the relief of pain by the X-rays. Even those patients who had been taking opium seemed sometimes to be more signally relieved by the X-rays than by the opium. As to burns, it is probable that the tube rather than the source of the current is responsible. Tubes of low vacuum (small penetrating power) are more likely to burn than those of high vacuum (great penetrating power). The coil has somewhat more tendency to burn than the static machine, but burns from the latter are not unusual. Dr. Parham does not expect much effect in treating deep-seated disease, *e. g.*, cancer of the stomach, as it is doubtful, in the present state of our knowledge, whether we can so regulate the rays as to get deep effects without superficial injury. It must be remarked, however, that the greater the penetrating power of the rays, the less tendency there was to superficial burns.

The Treatment of Ozena by Electric Light.

Ign. Dionisio (*Gazetta Medica Italiana*, February 6; *British Medical Journal* May 10) directs the electric light (incandescent) by reflectors into the nose, or actually introduces a lamp with a water-jacket into the nostril, or uses a larger lamp in the mouth, illuminating the nose through the translucent facial bones. In every one of six cases there has been a noteworthy decrease of the crusts and secretion, and a disappearance of the characteristic fetor. Two

patients previously treated by the best means known, who had returned with the usual odor in spite of nasal douches several times a day, are now free of the odor and use no irrigation at all. Dionisio cannot yet say whether the cure is lasting, but believes that it is a valuable addition to the therapeutics of ozena.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

Electro-Therapy in Dilatation of the Heart. M. Hornung, Marbach. Archives d'Electricité.

The reported observations comprised fifty-six cases of heart disease. The currents employed were the sinusoidal currents, which have greater action than either the faradic or the static currents. It was in the hydro-electric baths that these currents were applied. The effect of the treatment upon the dilated heart was such that the patients became able to climb, to ride a bicycle, to row or to take long walks. The author explains the effect of electrization upon the heart and its involution, by the augmented contractibility of the peripheral vessels, thus diminishing the work of the heart, and by the effect upon the nervous system. The author showed graphically the percussion-like throbbings of the heart diminishing after a single sitting.

Discussion.

M. Benedikt asks if carbonic acid baths would not give analogous results.

M. Battelli thinks that the applied procedures would have no such influence upon the heart with the process of application indicated by the author and with the currents which he extols. The heart of an animal under an intense faradic current does not present any change; it is, therefore, a pure illusion to think of influencing by this process either the energy or the number of heart beatings.

M. Benedikt answers that the facts observed by M. Hornung seem undeniable. But the direct action of which M. Battelli speaks is a different thing from the indirect action of the faradic current upon the heart as advised by M. Hornung.

Electrotherapy and Orthopedy. By M. Albert Weil, Paris, Archives d'Électricité Médicale.

Certain modalities of electrical energy, well applied with a suitable technique, make part of the numerous means of action of orthopedic therapeutics, sometimes constituting in themselves the complete treatment.

Electrotherapy has, in orthopedics, a preventive rôle for deformities in all of the nervous or diathetic diseases of childhood which may produce deformities either of the limbs or of the trunk; and a curative rôle for the deformities themselves, once they are established.

Preventive remedies, employing mild galvanization, should be utilized as soon as the feverish fits in the infantile paralysis disappear; immediately after the birth in the obstetrical paralysis of the brachial plexus; after cutaneous cicatrization following traumatic injuries of the nerves.

As a curative remedy of reducible deformities it should be used at the same time as the massages (gymnastics in the treatment of infantile paralysis which has become chronic); in the treatment of spasmodic hemiplegia, at this same period; in scoliosis, flat feet, congenital club-foot, as well in cases curable without operation as in cases requiring operation; after operation muscular atrophies of certain anchyloses.

In old cases of infantile paralysis, galvanization of the limb, followed by separate excitation of the various affected muscular groups, can recall a certain vitality even if the latter has nearly disappeared; for inverted feet manually reducible, the general galvanizing of the limb followed by faradizing of the hyper-excitable muscles is very efficacious.

Discussion.

M. Moutier.—He has applied currents of high frequency in scoliosis and has obtained the best results therefrom.

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

Possible Aid to the Discovery of the Tubercle Bacilli in Urine. Z. P. Bryson, Journ. of Cutaneous and Genito-Urinary Diseases, September.

Bryson recommends as a means of determining the existence of tubercle bacilli in the urine, first the drawing off of the urine and then obtaining what residue remains by hypogastric pressure, that is to say, using the residual instead of tidal urine for the test. He reports several cases in which he says he would have failed to discover the bacilli if reliance had been placed alone in the search of sediment derived by centrifugalization of the tidal urine, and notes that in both cases they were found in unusually large numbers in the residual urine drawn with the catheter.

An Instrument to Diagnosticate Hydrocele. Frederic Griffith, Journ. of Cutan. and Gen.-Urin. Diseases, September.

Griffith advocates an instrument for the diagnosis of hydrocele, which consists simply in a tube or sheet of cardboard, blackened on the inside, through which the scrotal tumor is observed by transmitted light.

[An incandescent electric light behind the suspected hydrocele would illuminate the contents of the tumor to the best advantage.—R. N.]

Subparietal Rupture of the Kidney. Thomas A. Davis, Annals of Surgery, Phila., September.

From the cases quoted and his own experience Davis concludes that the reduction in mortality since Keen's report is largely due to improved technique. Fewer deaths have been reported from sepsis. Several deaths have occurred from hemorrhage which could undoubtedly have been avoided if more prompt and efficient means had been resorted to. He predicts the mortality will be reduced to 15 per cent. The expectant plan of treatment is permissible in cases where slight hematuria is the only symptom. Tumefaction, much blood in the urine, severe pain and history of great violence, each is a positive indication for prompt operative intervention. Early operation should be done whenever the history of the case and symptoms point to serious injury of the kidney. Nephrotomy, with gauze tampon, where not too much blood has been lost, and nephrectomy where the kidney is irreparably injured and in less extensive injuries where either sepsis or hemorrhage is likely to prove fatal, are the operations of choice. In delayed cases it may be difficult or impossible to know just what is best to do. Each case must be considered, and if in doubt, operate. Most of the cases described as shock are depression of the vital force from hemorrhage or sepsis, and nothing short of prompt surgical intervention will prevent collapse. He says operate on the history of the case rather than wait for symptoms, which may only suggest what should have been done earlier, but at last proclaim the condition without hope for relief.

The Medical News, New York, of April 26, contains four papers on the Prostate which are all well written and worth perusing.

1. The Diagnosis and Operative Treatment of Prostatic Hypertrophy, with Remarks on the Complications before and after Operation. Ramon Guiteras.

2. The Indication for and Limitations of the Bottini Operation. Louis E. Schmidt.

3. Gonorrhea of the Prostate. Ernest R. W. Frank.

4. Prostatic Hypertrophy. Lewis Schooler.

Here we find almost a library on the diseases of the Prostate, its treatment, and particularly the Bottini operation. It is very pleasant to notice that Bottini is more recognized without any push on his side, and that his modesty has gained a great victory, even if he had to write for almost a generation's time. For once it is lucky to have had a long life, and not succumbed before a recognition of his merit.

The authors of these four articles are all well known as genito-urinary surgeons and have observed the diseases of the prostate.

Guiteras, in an elaborate paper, defines the reasons for selection between prostatotomy and the Bottini operation and insists on careful examination; on the education of the general practitioner in these diseases, on experience as well as thoroughness of the operator, considering the state of near and remote organs, age of the patient, and on all other circumstances.

Louis E. Schmidt considers a thorough examination with the cystoscope as important; and concludes that good results depend on carefully selected cases, on correction of errors or mistakes, and on a good technique and careful after-treatment.

Frank prefers protargol to free the urethra of gonococci, uses the endoscope, and makes frequent microscopical examination to guide the treatment. He reports sixty cases treated in this way with good results.

Prostatic Hypertrophy.—The symptoms and diagnosis are first noted by Schooler. The prognosis depends on the early diagnosis and prompt treatment. He has no confidence that drugs will affect the growth. Massage, he thinks, is also useless and may be harmful. Catherization, while palliative, is almost invariably liable to produce infection. Dilatation has its best results in incipient cases, and better effects will be obtained if the patient is made to understand the necessity of frequent séances and their long continuance. Cystotomy is a temporary or procrastinating procedure and is most useful where the bladder is affected or cystitis exists as a complication, and it also offers a chance for better examination. He thinks we need a better knowledge of the anatomy of the gland. Its pathology calls for an advance in our therapeutic resources for something more than to temporarily relieve the constant threat to the life of the patient.

Prostatectomy by the Perineal Route. Parker Syms, *Annals of Surgery*, Philadelphia, April. This operator prefers a radical cure by the perineal route.

The American Association of Genito-Urinary Surgeons held their annual meeting at Atlantic City, April 29 and 30, 1902.

Nearly a day was devoted to the diseases and operations of the prostate, in which many members took part in the discussion. Preferences for certain operations were expressed as follows:

a. Removal of the prostate by suprapubic cystotomy, when:
 1. General enlargement of the gland, with extreme intravesical projection of the median or lateral lobes, diminishing their accessibility from the perineum. 2. Marked pedunculation of the intravesical tumors, with absence of obstruction from other sources was present.

b. Operation by perineal section: 1. General hypertrophy, involving the lateral lobes, without extreme intravesical projection. 2. Large or very thick bar formation. 3. Severe compression of the urethra between massive lateral lobes. 4. Excessive development of the prostate in the direction of the rectum. 5. In most cases where the patient is in general good condition, is not very old, and there is not a special indication favoring one of the other operations.

The Bottini operation is preferable in: 1. cases of extreme debility, or of extreme age, unable to stand one of the severer operations. 2. Cases of bar or median sessile obstruction of not too great dimensions. 3. In complete collar formations. 4. Horwitz says it should be employed as a prophylactic against further obstructive tendency at the beginning of catheter life.

The discussion was continued by several other members.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

X-Rays in Treatment of Malignant Growths. By Rudis-jicinsky, M. D., in the New York Medical Journal.

He reports three interesting cases as follows:

CASE I.—Mrs. M. L., forty-six years of age, married. No children. Carcinoma of the right breast for two years. Microscopical examination made and diagnosis confirmed. Slender, rather anæmic, tuberculous family history. Glandular swellings in axilla. When referred to me for X-ray treatment there was a hard and very painful ulcer, of the size of a silver dollar, above the nipple, with an inflamed area around, and three sinus openings with epithelial outgrowths around and below the nipple. To get better results, the field of infection was treated with the X-ray for four weeks; then the whole breast with lymphatic tissues in the axilla was removed, and the X-ray treatment continued for eight weeks. The tumor under the first application of the rays diminished in size, the ulceration diminished also before the radical operation, and pain was wonderfully decreased. The glands of the

axilla became smaller, but were still hard, after a lapse of four weeks. The rays were employed five days a week for ten minutes at a time, and at a distance of six inches. After the radical operation the scar under the second application became very smooth. At the end of nine weeks the patient's general condition was markedly improved, though she received no medication. She was discharged December 8, 1900. No signs of recurrence.

CASE II.—A. S., forty-five years of age. Family history good. Epithelioma of the lower lip, recurring after extensive operation, in eight months. X-ray treatment was advised, and the patient made a steady improvement under the same. After a lapse of twenty weeks the patient was in comparatively good condition, the growth having disappeared entirely. The patient moved to Nebraska, and was not under constant supervision or repetition of the treatment, as suggested, to prevent the disease from regaining its hold. In one year the growth reappeared near the old scars, finally involving the whole side of the face, and the patient was operated on again at the hospital in Lincoln, Neb. The patient died four weeks after the operation, in excruciating pain, it is said.

CASE III.—Mrs. A. K., aged fifty years. Her mother died of carcinoma of the breast, when fifty-two years old. Condition two years ago: Hemorrhages after the menopause. Offensive discharge from ulceration at the cervix uteri. The cervix seemed to be alone involved. There was pain occasionally, with cachexia. A rough, ulcerated area at the vaginal portion of the cervix. Uterus not enlarged. When the patient was in the dorsal position, with elevated pelvis, the seat of ulceration was first thoroughly cleaned and curetted, and iodized phenol was applied. Then the uterus was drawn down into a funnel-shaped speculum, covered with tin foil, and the cervix drawn forward, and exposed to the X-ray. The Crookes tube of small size was placed in a cardboard box, and so arranged that the raying was done under a dark cover laid over the patient, the connecting wires being insulated with rubber tubing, and held in position under the Yale chair. Contact was impossible, the whole procedure being not inconvenient to the patient. The working of the tube was constantly observed with a fluoroscope through the covering, and the thighs and external genitals were oiled with olive oil and protected with a few layers of tin foil. The tube was a medium soft, placed just above the part of the cervix exposed, which was treated at a distance of six inches. Sitzings for ten minutes with a radiance of medium intensity, twice a week, until reaction manifested itself in three weeks. Treatment was stopped then, for two weeks, just for observation, and renewed with four sittings

a week. (The work had to be done with great caution, to administer enough of the X-rays without injuring the patient, and yet enough to cause retrogression of the new growth. Definite measure of the "dosage" has to be found in every individual case, and the choice of a "soft," "medium soft" or "high-vacuum" tube differs accordingly. In regard to the exciting apparatus, it makes no difference whether it is a coil or a static machine of good make. After the proper source of electricity, we need to have our tube at its best, and nothing more. But to return to our case.) The pain ceased in the third week of our treatment completely, the discharge was not profuse, and the diseased area showed marked improvement. There was a little redness of the skin on the right thigh, due to the radiation in the beginning, which subsided, however, in a few days. In four months the growth disappeared, the cervix was soft, and seems to be in good condition so far yet. No recurrence reported.

CASE IV.—A. L., forty-four years of age. Farmer by occupation. Family history good. Carcinoma of the stomach for one year. Condition very bad. His physician advised X-ray treatment as the last resort. No promises were made, but the patient gave consent for the experiment. The case, though marked by a fatal termination, showed remarkable features deserving of consideration. My coil was placed in the apartment of the patient, and a high-vacuum tube employed. The rays were applied over the whole area of the stomach. Superficial growths, with no intervening sound skin, may be treated by a soft, or soft medium tube, while internal growths are attacked better with a high-vacuum tube from the first. Exposures in this case were made for fifteen minutes at the start, the disk of the tube being directed against the tumor at a slight angle. Tumor six and a half inches in length by three inches in width, at the pyloric end of the stomach. Ten exposures were made without reaction, beginning July 19, 1900.

July 29. First sign of reaction. Vomiting ceased, but the fever was higher, the temperature rising from 100° to 104° F. Pain somewhat lessened. No hemorrhage. Some beef soup was retained for the first time in many days. Feeding per rectum stopped. Examination of the blood showed great increase of erythrocytes and great diminution of leucocytes.

July 30. Second raying since the reaction. No vomiting or dyspnoea. Milk and liquid nourishment. No change in the tumor. Temperature 100° F.

July 31. Third raying. Exposure twenty minutes. Vomiting with blood, ejecta not so offensive as usual. Dyspnoea, nausea, and hiccough. Nourishment promptly ejected. Temperature 100° F., pulse 90.

August 1. Fourth raying. Patient distinctly improved. Tumor seemed to be softer. Vomited once, no odor present. Dyspnoea not marked. Temperature 99.8° F., pulse 80.

August 2. Fifth raying. Tumor softened over the whole extent. Same condition. No vomiting.

August 3. Sixth raying. Same condition.

August 4. Seventh raying. Treatment in the morning. Pulse 120. Temperature 103° F. Collapse in the evening and the patient died; whether from exhaustion or self-infection it is hard to tell, but the case seems to be very suggestive, and shows that the employment of raying in internal malignant growths may be worthy of extended trial.

The method of treating the cancer of the uterus was ingenious, and the result most satisfactory.—J. D. G.

X-Ray in the Treatment of Cancer and Other Malignant Diseases. By Emil H. Grubbe, B. S., M. D., in the Medical Record of November 1, 1902.

After discussing the physiological effects of the rays he reports several cases treated and relieved by this means.

CASE I.—Lady, aged forty years; had been operated upon for cancer of the breast three times. The whole scarred area was covered with the pea-like nodules of the returning growth. Under the X-ray these nodules gradually faded away, appetite improved, pains disappeared, and patient regained her strength and the improvement in her general health was very great.

Treatments were given daily for first month and then every other day for the next four months. In this patient, while not strictly justified in calling it an absolute cure, he designates it a symptomatic or clinical cure.

CASE II.—Recurrent scirrhus of the right breast in a lady forty-eight years of age. He commenced to treat with the X-rays September 5, 1901. The treatment was given daily until November 15, 1901, when, owing to dermatitis, treatment was suspended until December 5, when treatment was again continued to January 20, 1902, when all of the nodules had entirely disappeared. The keloid condition present in this case was markedly affected by rays.

CASE III. is a very notable one, owing to size of ulceration of breast, measuring 7 x 5 1-2 x 2 inches. Owing to severe hemorrhage the patient was very weak and emaciated. The discharge was abundant and foul, and the glands in the axilla were very tender.

X-ray treatment was given every other day and continued until the third week of treatment, when a burn was perceived. The tube was placed at a greater distance, but every other day exposures continued. After two more weeks marked

changes began to take place, and in three months from the beginning of treatment this large surface was healed over, and to the time of writing no symptom of return had been noticed.

CASE IV.—A severe case of lupus of left temple, cheek, nose, and face. Various treatments had been tried for years, but without avail. The X-ray treatment was commenced on December 2 and continued to January 10, daily, when the looked-for dermatitis manifested itself and the treatment was discontinued. In three weeks the inflammation had subsided and the parts were covered with new soft and perfectly healthy skin. One month later the hair and eyelashes had begun to return.

CASE V.—Lady, aged fifty years, having large scirrhus of breast. Treatment was given daily for two months, when decided dermatitis developed and the breast began to break down. The growth seemed to become entirely enucleated, and in about one month had thrown off the entire cancerous tissue, after which the wound healed nicely and there have been no symptoms of return, the patient having been frequently examined since dismissal.

CASE VI.—Lady, fifty-two years of age. Uterine cancer. Uterus had been removed, followed later by an attempt to perform a second operation, but the conditions were such that the surgeon sewed up the wound and told her husband that it was impossible for her to live but a very few weeks.

X-ray treatment was given daily for ten minutes for two months, and the patient had gained twenty-two pounds, was free from pain and the foul odor had almost ceased. At the end of three months she was discharged symptomatically cured. During the past eleven months there have been no symptom of return and she writes that she has not felt so well in years.

His conclusions are as follows: 1. The X-ray is the most remarkable therapeutic agent discovered in the last decade.

2. In properly selected cases of so-called incurable conditions the X-ray has brought about remarkable results.

3. Relief from pain is one of the most prominent features of the treatment.

4. Retrogressive changes are noted in all primary cancer and tuberculous growths.

5. The X-ray has a pronounced effect on internal cancers.

6. The greatest value of the X-ray is obtained from treating post-operative cases to prevent recurrence.

7. The proportion of clinical cures by this treatment is greater than that obtained by any other method.

8. We are positively justified in assuming an idiosyncrasy to X-rays.

9. Peculiarities of each case must be studied to get the results. No strict rules for treatment can be laid down.

10. Dermatitis, if properly produced, is within certain limits a desirable feature in X-ray treatment.

11. Since the vacuum of an ordinary tube changes constantly, such tubes are useless for radiotherapy. Only tubes should be used which allow of perfect adjustment of their vacuum.

12. Even in hopeless, inoperable cases the X-ray prolongs life, makes the patient comfortable, and the last hours free from pain.

The X-Ray in Therapeutics.

In the *Northwestern Lancet* of November 15 Dr. W. P. Spring contributes a paper upon the above subject, in which he reports twelve interesting cases treated. He concludes his valuable paper as follows:

"1. In superficial malignant growths, the certainty of cure by the X-ray is so great, and the recurrences after operations are so frequent, that it is at least an open question whether it is advisable to operate at all. Some of the men most experienced in the use of the X-ray, Morton among them, are decidedly opposed to any operative measures.

"2. In cases that can be thoroughly operated upon, I believe a short period of X-ray treatment before the operation is desirable to destroy the outlying portions of the growths; and knowing the frequency of recurrence after operation, it seems to me there can be no question as to the desirability of giving the patient every possible chance by the immediate application of the X-ray, without waiting for any new growths to take place. The patient should then be carefully watched, and at the first evidence that the operation and X-ray treatment have been unsuccessful, the treatment should be immediately renewed.

"Then we shall not have so frequently, reports of results: 'died of exhaustion'; 'died of metastasis'; 'died of toxæmia,' etc.

"3. In large growths removal is desirable, or establishing free drainage to prevent auto-intoxication, which is a real danger in aged persons or those much debilitated, as is shown by the number of patients who have succumbed to toxæmia during treatment.

"4. Inoperable cases should certainly be given the benefit of the X-ray, for we have the reports of too many that have been relieved of pain, have had foul discharges stopped, hemorrhage lessened or stopped, and their lives prolonged and made comfortable, to refuse these sufferers any chance of relief.

"Most important is the fact that some such cases have been permanently cured, and in affording these inoperable cases relief we shall give to some of them restored health."

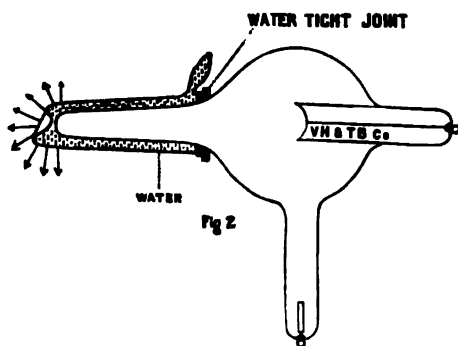
RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

A Special Type of Crookes Tube for Therapeutic Applications of Roentgen Rays to the Cervix of the Uterus. By E. W. Caldwell, B. S., New York.

It will be noticed that in this tube, as in the old pear-shaped tube of Crookes, the cathode stream impinges, not upon a metal target, but upon the glass wall of the bulb, which therefore becomes the source of X-rays. There is also a considerable amount of heat developed at the point of impact of the cathode stream, and it is therefore necessary to cover the target end of the tube with a water jacket in order to keep it cool. At the end of the water jacket, shown in the diagram, there is a depression for the os uteri which is intended to assist in keeping the tube in proper position. For the suggestion of this improvement I am indebted to Dr. Margaret A. Cleaves.

As indicated by the arrows in the figure, the rays emanate from the end of this tube in every direction—a condition



which seems desirable in the treatment of most cases of cancer of the cervix of the uterus. If it is desired to limit the delivery of X-rays to any part of the area on which this tube is used, it can be done by removing the water jacket and covering the corresponding part of the end of the tube with thick metal foil. The water jacket may then be replaced and the tube is ready for use. A number of jackets of different shapes for different cases may be used upon the same tube. In conclusion, it seems proper again to call attention to the fact that in tubes of this type the source of the X-ray is brought very near to the part under treatment, and the duration of exposure or the excitation of the tube must, therefore, be correspondingly decreased, in order to keep within the limits of safety.—N. Y. Med. Jour., November 20.

Death Due to X-Ray (?) By Maurice Rubel, M. D., Baltimore.

Narration of the case.—A skiagraph was taken October 8, 1901. Two exposures, each lasting twenty minutes, were made. A Leeds coil was used, spark three inches. Tube was sixteen inches from the plate, about six inches from the abdominal wall. About four days later little papules appeared over an area one-half the size of the hand, just above and to the left of the umbilicus where there was intense itching and burning. In the course of three weeks the skin over the entire abdomen became dry, assuming a purplish-red color. Soon blisters appeared, discharging thick yellowish material. On November 17 patient was readmitted to hospital and the following conditions found: On the center of the abdomen there is an area of about 13×20 cm. in diameter, which is red and raw, and completely denuded of epidermis. It is bathed with a thin greenish-yellow discharge, which is apparently very irritating to the surrounding skin. The entire area is extremely tender to the touch, the slightest pressure causing excruciating pain.

The treatment consisted of applications of lead acetate to the wound and a two per cent. salicylic ointment to the surrounding skin. Three weeks later the wound area was considerably less, being only 12×9 cm. The formed cicatrix once more broke down and a triangular ulcer 14×14 cm. resulted. The ulcer was 3 cm. deep and covered with necrotic tissue.

On July 31, 1902, the ulcer having no tendency to heal, skin-grafting was resorted to, but the grafting was unsuccessful. The general condition of the patient was as follows: Soon after admission to the hospital it was noticed that the patient was constipated, and the bowels failed to respond to the ordinary laxatives. Each day she was given increasing doses of purgatives, and enemata, but with no result until the thirteenth day. During that time the patient experienced some abdominal discomfort and nausea, but did not vomit. For the following week and a half there were small movements of the bowels every other day, but with the aid of enemata and medicine.

Beginning December 12, the bowels became inactive again, with nausea and vomiting. All nourishment was discontinued by mouth, and nutrient enemata had to be resorted to. The patient rapidly lost weight and her condition became serious. For twenty-two days the patient had no stools. Hypodermic of atropin and strychnine proved useless. All efforts to obtain a bowel movement were unsuccessful, until January 3, when there were three copious movements. Until January 12 the bowels moved three or four times daily. The condition of the patient at once improved. The pulse, from

140 fell to 110; vomiting ceased. After the 12th the patient had another attack of vomiting, pulse rose to 150, constipation again occurred, and the patient was worse than in the previous attack. This persisted for twelve days, when for some unaccountable reason the patient had again several copious movements, and as before she rapidly improved. The patient was again subjected to the skin-grafting. She bore the anæsthesia well. Her pulse began to be rapid, ranging between 120 and 140; the temperature was variable. On the eighth day after operation the mouth and tongue became ulcerated and were soon so tender that no food or liquids could be taken. Local treatment was of no avail. The patient steadily grew worse and died on the twelfth day after operation. No autopsy was granted.

What was the cause of death? Whether or not death was due to the X-ray could not of course be definitely settled without a section. It is most probable that the patient had some intra-abdominal trouble which could not be determined. On the other hand the peculiar symptom-complex makes it appear as though the Roentgen ray may have produced some tissue changes of which we are totally ignorant. It seems probable that, aside from the pathologic lesions produced in the nerves and vessels of the abdominal wall, similar injury may be wrought on the sympathetic system. Instances cited where the prolonged use of the X-ray on the abdomen causes nausea and vomiting plainly indicate that some obscure changes may take place, as a result of the exposure. —*Jour. Am. Med. Assn.*, November 22, 1902.

[The report of this interesting case deserves consideration, and the doctor should be congratulated for the careful report of the case. It is to be regretted that no autopsy was permitted and no pathological report is added. It would also be valuable to know what sort of a Crookes tube was used. Whether the vacuum was high or low. Whether the position of the tube was the same in both rayings. The doctor raises an important question: Does raying over the abdominal region produce changes in the sympathetic nervous system? Probably in no other region of the body is the sympathetic system so widely exposed to the rays coincidently as in the abdomen. Whether the constipation in the case reported was caused by some change in the mechanism of bowel activity, produced by the X-ray, or whether it was due to some intra-abdominal trouble, remains an open question. Experience has shown that in some cases therapeutic application of the X-ray to the abdomen is followed by copious bowel movements, amounting at times even to diarrhea.]

DERMATOLOGY.

EDITED BY ALBERT C. GEYSER, M. D.

Lupus Vulgaris.

Dr. J. W. King of Bradford, Pa., reports a case of lupus vulgaris covering a surface as large as a silver quarter after a treatment of about one month, during which he had administered several exposures from a Cromolume arc-light apparatus of from thirty minutes to one hour each; two X-ray exposures; and two applications of the static spray of thirty and twenty minutes respectively without producing a favorable result.

He then adopted a heroic measure, employing the X-ray from a tube which backed a four-inch spark-gap, for one hour. After this exposure no others were administered. A scab formed, and in a short time the spot had entirely healed. The doctor compares this to a case published in the April number of this JOURNAL by him in which case eight exposures had been made on alternate days of from thirty to forty-five minutes with the X-ray, in which the time had been thirty to forty-five minutes, at a distance of six inches from the tube, without improvement. He then made one exposure of one hour, after which the recovery was complete. He therefore concludes that long exposures are essential to derive sufficient reaction to bring about a prompt recovery.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Hydrotherapeutics in Gastro-intestinal Diseases. By George Manheimer.

The writer states that the most important procedure in these diseases are lavage and douching of the stomach and lower bowel, and gives the reasons therefor as stenosis of the pylorus with stagnation and fermentation; by its use removing foreign substances, such as mucus in gastritis, pus neoplasms, superacid gastric juices in gastrosuccorhea. Its most extensive use, however, is in the treatment of the neuroses, motor and sensory, especially in simple atony. Its mechanical uses are readily and easily understood, and appeal at once to the common sense of the practitioner. While acting as a sedative

in one instance and a stimulant in another, it also acts psychically in many instances. In chronic colitis and in the various obstructive conditions of the colon high enemata in the Trendelenburg position may succeed in removing fecal impaction or liberating a strangular loop. The writer further dwells on the advantages of external applications of hydrotherapy in the shape of the compress and abdominal bandage, the uses of which are fairly well known and understood by the profession, such as the very hot compress, Leiter's coils, etc. The best results, however, of hydrotherapy are where "it is generally applied to the entire surface of the body, because its best effects are brought out in that way, namely, its influence on circulation, respiration, and innervation, over secretions and excretions." Its general application and greatest field for usefulness are in chronic disorders, especially functional ones found in neurasthenic, hysteric, or such cases where there is a disturbance of the cerebro-spinal centers. "It is the great advantage of hydrotherapy that it can be so modified as to suit almost any case and condition where it is at all indicated."

Hydriatic Methods. Buxbaum, *Centralblatt für die gesammte Therapie*, describes some of the simple hydriatic methods which should become well known and widely used by the profession. One of the most important as well as the simplest is the affusion which requires a large bathtub and two or three pailfuls of water. The effect of affusions depends upon the temperature of the water and the force of impact or, in other words, the distance from which it is made to fall upon the surface of the patient and the duration of its application. It is excellent in diseases of the circulatory and nervous system, as it strongly excites the brain and spinal cord. He suggests hot abdominal affusions in prolapse of the stomach and intestines, but they should not be employed in anæmia or neurasthenia. They may be used for the relief of headache due to hyperæmia of the brain, but the application must be made to the lower extremities. Cold affusions restore tone to the vessels when lost, diminish the heat of the surface, and thereby fortify the body against rheumatism and cutaneous disorders.

The Hydriatic Treatment of Atony of the Bladder. Editorial, *Modern Medicine*.

Atony of the bladder is well recognized as most rebellious of ordinary therapeutic management. Internal medication practically amounts to nothing in the treatment of this con-

dition, which is frequently encountered in old men, especially those of sedentary habits and those who have long suffered from enlargement of the prostate or chronic cystitis. The hydriatic is based upon the extreme sensitiveness of the bladder to cold impressions and responds very quickly to cold applications made either to the mucous membrane or skin. Applications to the cutaneous surface act reflexly through the spinal centers. The application should be made to the feet, legs, perineum, or to the lumbar region. The effect of immersion of the body in cold water, causing contraction and emptying of the bladder, is well known. An excellent means of combating atony with cystitis is the prolonged cold sitz bath at 80° F., lowered 1° or 2° daily until 65° or even 60° is reached, with a duration of from eight to ten minutes. The limbs should be kept warm, which will drain the pelvic vessels and compensate for the fluxion of blood to the hips and toward the pelvis. Another application of still greater power is the cold bladder douche. The lower the temperature the greater the energy of the contraction produced. The water used should be sterilized by boiling for a half hour and should contain about one dram of salt to the pint, and have been cooled by placing in iced water. Distention should be avoided and the viscus carefully drained. As inflammation subsides colder applications may be applied until strong tonic effects are produced. Great benefit may generally be derived from irrigation with the neutral (96° to 98°) saline solution, a dram of common salt to a pint of distilled or sterilized water. This has a soothing effect, washes away the irritating material, and removes the hyperacidity. It is always well to allow a certain amount of the neutral solution to remain in the bladder.

DIETETICS.

EDITED BY SIGISMUND COHN, M. D.

The Respective Merits of Vegetarianism and Mixed Diets. From L. Kuttmer in the Berliner Clinic.

The author's conclusions are as follows:

1. A mixed meat diet is natural and most suitable to man, because vegetable foods are more bulky, more irritating, and less assimilable. Moreover, animal foodstuffs produce more heat.
2. Impartial investigation has proved that given judicious choice and preparation, strict vegetarianism is not only sufficient to maintain condition, but even to increase weight. Successful experiments are, however, few and far between,

and the subjects do not as a rule compare favorably with those who eat mixed or animal diets in their capability to put on weight and resist disease.

3. A modified vegetarian diet (*i. e.*, one supplemented by milk, butter, cheese, honey, eggs, etc.), is suitable for (*a*) corpulent, constipated patients, deficient in intestinal activity, but it is not to be recommended in the case of growing, young people with a tendency to *embonpoint*; (*b*) in certain cases of alcoholism; (*c*) it is followed by brilliant results in dyspepsia and intestinal affections of nervous origin; (*d*) it is particularly to be recommended in idiopathic neuralgias, as well as those having a gouty basis; (*e*) useful in the treatment of headaches and other disorders dependent on constipation in neurasthenic, hysterical, and epileptic patients; (*f*) as the pulse rate is diminished under a vegetable diet it is to be recommended in conditions of abnormal irritability of the heart (arising from emotion, excessive muscular action, sexual excitement, etc.), and in exophthalmic goiter; it is contra-indicated in all conditions of heart weakness due to arteriolar sclerosis, myocarditis, etc.; (*g*) a marked addition of vegetables to the diet should be considered in many cases of insomnia nervosa, urticaria, psoriasis, and occasionally scrofula.

4. To achieve a favorable result in absorption, a reasonable combination of animal and vegetable foodstuffs is essential. For all healthy and for most sick persons, a mixed diet (different in degree and constitution according to the patient) is to be recommended.

5. As a guide to the arrangement of a suitable modified vegetarian diet the following may be of value: in weak, broken-down patients with chronic catarrhs and an inclination to atony of the stomach, a vegetarian diet must be gradually approached, and must be only maintained temporarily (about six weeks); in gastric neurasthenia, and especially in habitual constipation in patients of good physique, a vegetarian diet may be instituted less gradually, and may be maintained for a longer period.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

Psychiatry.—The Basic Principle of Psychological Treatment. By Maurice E. Pilgrim, M. D.

The profession of medicine has always been conservative. It will doubtless continue to retain this characteristic. While this quality is highly commendable within certain limits, it

ought not to be pushed to such an extent as to block or make unreasonably difficult the path to advancement. The universe itself does not stand still. It seems to have been ordained that nothing in the realm of nature can long remain stationary and preserve its identity. There is more real danger to our profession from extreme conservatism than from extreme radicalism, much as the latter might most justly be deplored.

The relation that psychiatry sustains to-day to general medicine is very similar to that occupied by electro-therapeutics up to a very recent date. Electro-therapy has won its contest and secured its place in the therapeutics of the future. It has required years of faithful perseverance to accomplish it, however, and even now there are many who are ready to set its limitations while yet we do not fully recognize its possibilities. Psychiatry has not yet won, by general consent, a place in the therapy of either the present or the future. Already there are those who, professing a belief in its efficacy, are preparing to define its limitations. We cannot deal intelligently with limitations until we have by patient study and investigation acquainted ourselves with its possibilities.

The profession was very slow and reluctant about recognizing hypnotism as a therapeutic factor, and still more in countenancing what has now come to be known as "suggestion." Medical literature is bringing it to the attention of the profession, even though its indorsement of it is, for the most part, very mild and almost provisional. Already we hear about the limitations of psychic-therapy even from those who profess to be utilizing it in their work.

Hypnotism is only one of several important factors in psychology, as every student of it well knows. Psychic "suggestion" as it is generally understood now and practiced, is by no means all of psychiatry nor the most important branch of it. Hypnotism and "suggestion" are only steps in a system of therapy that promises richer results in the near future than its friends at present dare to anticipate. But we must push up and beyond its elementary steps. In doing so, we leave many of the limitations behind which those not altogether enthusiastic in its behalf have discovered and set up.

The inclusive name of "suggestion" was doubtless not the

best that might have been selected, but it has become convenient to use it because it is so much in vogue. There are as many different visible ways of making suggestions for therapeutic purposes—and all apparently with more or less show of reason and with success—as the personal equation admits of variety. The ultimate object sought to be attained through all of them, whether consciously recognized or not, is to stimulate the *vis medicatrix naturæ*, by which is meant the healing power of nature inherent in the material body. The word of caution that it is desired here to offer is this: let us not fall into the error of *materializing*, so to speak, our methods of psychic treatment, losing sight of its real essence, and set limitations to its capabilities that shall operate to discourage other and more persevering investigators.

The tendency of the practice of medicine seems to be in the direction of materialism. Perhaps that explains somewhat the prevalent notion that the force of psychic suggestion resides mainly in the words employed or in the things done. Plying the sick with a continuous stream of asseverations and commands does not make them well. It is not the physician's vocal importunity, even though he makes his lips "the faucet to let loose a wash of words," that directs the recuperative forces inherent in the organism so as to evolve a cure. Diseased organisms do not respond to the sound of the human voice or the gyrations of the body. Recuperative changes in the body are not produced by empty words, but by the psychic stimuli which unconsciously accompany them. The real agent that does the work is a deeper psychical appeal, of which the verbal utterances are only symbols. Folks do not get well because we tell them to do so or positively predict their recovery. It is rather because, in conjunction with these oral statements, there escapes from us to the patient more or less of the psychic stimuli necessary to set going within their organisms the resident power that makes for repair.

In order to formulate it with greater precision, the best psychic treatment—and there is pre-eminently here as well as elsewhere a *best way*—is where the operator stimulates in his patient the greatest amount of self-help—*vis medicatrix*. By surrendering his objective faculties for the time being to his subjective consciousness, there is

initiated in the operator and transmitted to the patient the psychical stimuli which evoke the kinetic energy called *vis medicatrix naturæ*. This is the essence of every successful form of "suggestion," whether the practitioners know it or not. The message of help that passes from the suggester to the patient is a subtle, impalpable influence which affects some part of the gray matter of the brain and is not at all dependent upon words or the exercise of any physical force on the part of the operator. Words, physical attitudes or postures, facial expressions, and the like, are only co-incidental—never essential—with the transmission of the actual suggestion which is always wholly psychical, never material. The underlying fact that makes all true suggestion effective, is the psychological doctrine of the plurality of consciousness or of mind. The transmitted stimuli which arouse the resident but dormant forces of the invalid, are not affirmations or commands spoken by a physician and conveyed through voice and ear, nor are they the "concentrated thought" or "intense will" of one ordinary mind (objective) spurring on an enfeebled mind to a more determined fight with disease. That is not psychic, but mental, stimuli, and there is all the difference of the distance of the antipodes between them. It is precisely at this point where the greatest stumbling in the study and practice of psychiatry occurs. It is quite true that the transmission of psychical stimuli may be and often is accompanied by the exercise of material energy, but the point to be here insisted upon is that it is not at all an *essential* element in psychic treatment. Whatever formalities attend the phenomena of psychical treatment, the real power which evokes and produces the effect issues silently from a consciousness which acts without the aid of speech or will, traverses non-sensory adits and, oftentimes quite unknown to the patient, sets going within his body the organic and functional changes that make for cure. Despite all their absurd postulates and rankly ridiculous claims, so far as the best and correct method of instituting psychical treatment is concerned, the Christian Scientists, so-called, are much nearer to it, even in their arrogant empiricism, than are many of our physicians who think they have exhausted the resources of this therapy with hypnotizations and declamatory "suggestions."

In support of the contention that it is the attitude of the subconscious mind or self, and not the physical acts performed or words spoken, that exerts the curative effect on the patient, the writer desires to state that he has successfully treated psychically many patients who neither understood nor spoke his language. The same statement is true in respect to experiments on dogs and animals, who certainly did not understand much of our vocabulary. As a matter of fact, however, words were never employed in these experiments.

If more time were devoted to efforts at concentration and holding abeyant, for the time being, the objective senses so that the largest measure of psychic stimuli might pass to the patient instead of wasting energy on mere vocable, we should probably hear less about the limitations of treatment by psychic suggestion. The highest success in this treatment presupposes and fairly demands from the operator some psychological study and much faithful practice. Why in psychiatry any more than in other departments of medical science, should the highest success be expected without careful study and much preparatory practice? Every person possesses some natural fitness for this work—some very little, others much, but all alike require the development that comes only as the reward of patient and persevering practice intelligently applied. The study of the fundamental principles at least of psychology is as important and necessary for the aspirant for the largest success in the practice of psychiatry as is anatomy to the surgeon, or materia medica to the prescriber of drugs. A physician is not supposed to attempt to administer drugs until he has acquired a thorough knowledge of their properties and actions. Why should he expect to attain the highest success in treating the sick psychically or by "suggestion," without first possessing a working knowledge at least of the psychological laws governing the operation of the tremendous force he attempts to call into action?

SOCIETY MEETING.**REGULAR MEETING OF THE CLINICAL SOCIETY
OF THE NEW YORK SCHOOL OF PHYSICAL
THERAPEUTICS.**

At a meeting of the Society held at the School, 627 Lexington Avenue, on Friday evening, November 2, the President, Dr. Robert Newman, in the chair.

A paper by Dr. William Benham Snow, and demonstrations of "The Therapeutics and Methods of Application of the Static Brush Discharge and the High Frequency Currents as Administered with Glass Vacuum Tubes from the Static Machine and Coil." *

Dr. Milton Franklin followed with an exhibition and demonstration of the actinolite.

He said: In the Finsen laboratories tubes are used in front of the arc light, and the fact that they employ four or five tubes does not necessarily mean that each one gets one-fourth of the light. Inasmuch as the tubes are placed a certain distance from the arc and the light spreads in every direction from the arc, each tube will concentrate its proportion of rays. It is almost impossible to have the rays proceed in one direction from the arc. The arc can, however, be so arranged that the negative, or lower carbon is placed in advance of the upper carbon, so that the crater of the upper carbon, from which the greater amount of light emanates, points directly at the lens. By such an arrangement the maximum of light is concentrated upon one lens in front.

The instrument before you has only one lens, and the arrangement is such as to concentrate as much as possible of the light in one direction. The apparatus in this way is simplified and made portable and adjustable, although it is true that only one patient can be treated at a time. The Finsen light apparatus has lenses not more than three inches in diameter, and they are placed at a distance of about eighteen inches from the light, which means that comparatively little light is received by the lens. As the latter is brought nearer the light, the altitude of the triangle with the lens as base and arc as apex diminishes, the angle at the apex becomes greater, and the light increases in proportion to the square of this angle. An effort has been made to place the lenses as near the light as is practicable. In the instrument before you the lens is placed at a distance of seven inches, which is the shortest distance at which the lens can be safe from overheating. Another way of increasing the angle referred to is by increasing the base of the triangle—in other

* The paper will be published in a subsequent issue of this JOURNAL.

words, the diameter of the lens. Thus, a lens of six inches in diameter will give four times as much light as one of three inches in diameter placed at the same distance from the source of light.

The actinolite is exceedingly adjustable and the apparatus is complete because it has its own rheostat and resistance, and consequently only requires to be connected to the source of electricity by means of a cable. Provision is made for focusing the condensing lenses. The system in this apparatus is not achromatic, and for this reason the blue and violet rays come to a focus at different distances from the lens. This is a decided advantage, because it is well known that the red end of the spectrum is the hot end, and the violet end the chemical end. One of the most difficult problems in the practical application of this light is to separate the heat and chemical rays. In a reflecting apparatus, properly made so as to give good effects, the heat and light rays are concentrated at the same point. By the arrangement just described this apparatus separates the heat and light rays. In addition to this a water-bath is made use of to filter out some of the heat rays. In the Finsen Institute the rays are parallelized and passed through tubes from four to six feet in length, though it is well known that the air absorbs a good deal of the ultra-violet rays. In addition, they make use of three systems of lenses besides the compressor, thus greatly diminishing the light before it reaches the patient. The Finsen apparatus is run at an enormous expense and requires a very long exposure. The lenses of the actinolite, on the other hand, are eight inches in diameter, and usually collect about seven times as much light as one of the Finsen lenses. The actinolite has an arc which is unusually violet. This is accomplished by introducing into the carbons certain substances, particularly iron. It has not been found practicable to make use of iron carbons except when they are very small. It has been found utterly impossible to maintain an arc for more than thirty or forty seconds because the iron melts, destroys the arc, and heats and ruins the lamp. The carbons of the actinolite contain iron and magnesium, and the spectrum obtained from this light shows it to be very rich in the ultra-violet rays, quite as much so as the light from the iron carbons, while at the same time there is a deficiency of the red rays.

The Finsen light treatment is yet in its infancy, and I believe that when the treatment has been perfected it will have no competitors in certain fields. Our effort at present should be to devise apparatus which will shorten the exposures and reduce the period of the whole treatment. The machine before you is the most powerful yet devised and constructed. The makers have succeeded this summer in secur-

ing a kind of glass which transmits most of the ultra-violet rays. Ordinary optical glass almost totally excludes these.

Dr. Robert Newman: I should like to ask where the apparatus is made, how much does it cost; can we see it in operation applied to disease? Can it be used for the examination of internal cavities, as, for instance, the stomach? What are the statistics of treatment showing that this apparatus is better than others?

Dr. Franklin: This apparatus is manufactured in New York by Kliegl Brothers, Thirty-eighth Street and Broadway. The machines so far have only been used in a few institutions. One of these is to be installed in this school, and its action can be watched here. If the light be concentrated upon a person without precautions for removing the heat rays, the person will certainly be burned; otherwise the light is practically harmless at the ultra-violet focus. Theoretically, as I have shown, the lamp is greatly superior to others. It could not be used at all for the examination of internal cavities of the body. I have made various experiments with all sorts of fluorescent substances, hoping that something could be demonstrated in this way, but so far without success. The machine which I show you is listed by the manufacturers at \$300, while smaller ones may be purchased at \$200 and \$100 respectively. The cost of operation depends upon the local charges for the electric current consumed. These machines are made for both the alternating and direct currents, and with an automatic or a hand feed.

Dr. H. Grad: In the treatment of lupus is the part pressed against the glass?

Dr. Franklin: A special instrument, called a compressor, made of rock crystal, is used, and the light is focused upon this compressor. The patient must, of course, be placed at the focus.

Dr. Grad: I should like to ask also whether there are any X-rays in the pencils of rays emitted by this apparatus.

Dr. Franklin: I do not think there are, but we cannot speak with positiveness until more is learned of the true nature of the X-ray.

Dr. W. B. Snow: Is it as successful in the treatment of deeper conditions as in superficial lupus vulgaris?

Dr. Franklin: So far as I know, it has been extremely successful in all the countries in which it has been used. This treatment is considered absolutely specific for lupus vulgaris and the percentage of cures in lupus erythematosus has also been very high. I recall a case, seen in Richmond, Va., of a woman who had suffered for nine years from lupus erythematosus. I saw her both at the beginning and after two months of treatment, and one side of the face was absolutely cured. Since then the other side of the face has likewise been cured.

ANNOUNCEMENT.

The President of the American Electro-Therapeutic Association has appointed the following committees for 1902-1903:

On Induction Coils and Alternators.—Margaret A. Cleaves, M. D., Chairman, 79 Madison Avenue, New York City; A. E. Kennelly, F. R. A. S., Philadelphia, Pa.; Burton Kinraide, E. E., Boston, Mass.

On Electrodes.—Robert Reyburn, M. D., Chairman, 714 Thirteenth Street, Washington, D. C.; W. H. White, M. D., Boston, Mass.; C. H. Lador, M. D., Chicago, Ill.

On Meters.—R. G. Brown, E. E., 158 Montague Street, Brooklyn, N. Y.; Charles T. Scott, M. A. I. E. E., Pittsburg, Pa.; W. I. Jenks, M. A. I. E. E., New York City.

On Constant Current Generators and Controllers.—W. J. Herdman, M. D., Chairman, 48 East Huron Street, Ann Arbor, Mich.; Robert Newman, M. D., New York City.; L. H. Brown, M. D., Brooklyn, N. Y.

On Static Machines and Condensers.—William Benham Snow, M. D., Chairman, 627 Lexington Avenue, New York, N. Y.; F. Schavoir, M. D., Stamford, Conn.; G. Betton Massey, M. D., Philadelphia, Pa.

On Electric Light Apparatus for Diagnosis and Therapy and the X-Ray.—W. Scheppegrell, A. M., M. D., Chairman, 3723 Prytania Street, New Orleans, La.; J. D. Gibson, M. D., Birmingham, Ala.; T. D. Crothers, M. D., Hartford, Conn.

On Cataphoresis.—F. D. Morse, M. D., Chairman, Melrose, Mass.; F. B. Bishop, M. D., Washington, D. C.; M. F. Pilgrim, M. D., Boston, Mass.

On St. Louis Exposition.—William Benham Snow, M. D., New York City; William J. Morton, M. D., New York City; William E. Goldsborough, M. D., Lafayette, Ind.

BOOK REVIEWS.

THE PUBLIC AND THE DOCTOR. For physicians and the masses. By B. E. HADRA, M. D. Published by J. M. Colville, The Franklin Press, Dallas, Tex.

The object of this little volume is to assist in placing the "position and work" of a physician in their true light to the laity, and to increase "good-fellowship and confidence between client and physician."

It considers the physician and fads, the selection of a doctor, quacks and quack advertising, etc.; the education of a physician, and advice relative to consideration for a physician, professionally, financially, and socially. Its perusal by the masses ought to prove of value to the regular practitioner.

A COMPEND OF HUMAN PHYSIOLOGY. Especially Adapted for the Use of Medical Students. By ALBERT P. BRUBAKER, A. M., M. D., Assistant Professor of Physiology and Hygiene of the Jefferson Medical College; Professor of Physiology in the Pennsylvania College of Dental Surgery; Lecturer on Anatomy and Physiology in the Drexel Institute of Arts, Sciences, and Industries; Fellow of the College of Physicians of Philadelphia. Eleventh Edition, Revised and Enlarged, with Illustrations and a Table of Physiological Conditions. Price, 80 cents net. Published by P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia.

This little work treats the subject of Physiology in a complete and concise style and is provided with a complete index, making it a convenient reference book for the student or practitioner, who would study the subject. Such books are unquestionably of great value in these times for practitioners changing their residence to other States, and students of medicine who would review the subject, preparatory to the ordeal of examination. The work is provided with a large number of excellent cuts, illustrating various subjects, and seems in every way adapted to the purpose. The fact that the work has gone through ten editions is a guarantee of its excellence.

THE PHYSICIAN'S VISITING LIST FOR 1903. Philadelphia. P. Blakiston's Son & Co. (Successors to Lindsay & Blakiston). 1012 Walnut Street. Price \$1.00 net.

The work is complete and comprehensive in arrangement, neat, attractive, and substantial in form. It is a valuable addition to a physician's possessions and comfort, and can be highly recommended to all practitioners.

EARTH-BURIAL AND CREMATION. The history of earth-burial with its attendant evils, and the advantages offered by cremation. By AUGUSTUS G. COBB, formerly President of the United States Cremation Company, and Vice-President of the New York Cremation Society. Published by G. P. Putnam's Sons, New York, 27 West Twenty-third Street; London, 24 Bedford Street, Strand; The Knickerbocker Press, 1892.

The subject is well and carefully written by one thoroughly conversant with it from all sides. It is well worth the time spent in its perusal by the laity as well as the profession, and

is commended for its style, simplicity, and forcefulness of diction.

VOLUMES III. and IV., PARTS I AND II., OF THE TWELFTH CENSUS OF VITAL STATISTICS OF THE UNITED STATES, in the year 1900, William R. Merriam, Director. Prepared under the supervision of Wm. A. King, Chief Statistician of Vital Statistics. Compliments of Senator Thomas Platt.

The volumes present an excellent appearance, and are invaluable as books of reference. Too much cannot be said of the thoroughness and completeness of the work of this census. As a nation we may take just pride in the effort set forth by our government to thoroughly investigate matters of so great importance as those which pertain to the health of our citizens.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

The Actinolite, a new instrument for the administration of the ultra-violet ray treatment.

The Actinolite consists of a fireproof Russia-iron barrel, in front of which are mounted the collecting and condensing lenses and the cooling arrangement, and back of which is the fire box, containing an electric arc lamp. The barrel is mounted upon a swivel and trunnion worked by a circular rack and pinion, thus permitting of the finest possible adjustment. The whole is mounted upon a base containing all the necessary resistance; so that the machine need only be connected with the source of current, being absolutely complete in itself. The resistance is finely graduated, so that from one-half to the full capacity of the light may be used by simply turning a lever over a finely graduated dial upon the marble baseboard. The machine is mounted upon castors, which permit of the machine's being moved about the office with the greatest facility. The lenses are made of a newly invented flux, which is the only substance known outside of rock crystal which will transmit ultra-violet rays.

The cooling bath is of the optical filter pattern and the medium is the same glass of which the lenses are made.

Inlet and outlet are provided, so that the water may be kept in circulation where the machine is kept working for long periods.

The advantages claimed for this machine are:

1. Great proportion of energy transmitted as compared with amount generated.



2. Slight absorption of light rays.
3. High rate of efficiency, rendering possible very short exposures, and therefore economy.
4. Fine adjustability.
5. Compactness, the whole machine with all accessories occupying a floor space of three feet square in the largest size.

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RHEUMATOID ARTHRITIS.*

BY F. B. BISHOP, M. D., WASHINGTON, D. C.

The ætiology of this troublesome and painful malady seems as yet a question unsettled to the satisfaction of various observers. Some claim for it a rheumatic origin, while others think it a disease primarily involving the trophic nerve centers.

That the trophic, vaso-motor, sympathetic, motor, and sensory nerves are all involved, there can be but little doubt, from which one is led to infer that the nervous system is primarily at fault. On the other hand, the often sudden onset, with high fever, and painful joints, the subsequent lameness and deformity, the wasted muscles, etc., leave ample room for the belief in the rheumatic theory, if one is willing to allow his investigation to stop here.

The pathology tells us of degenerated muscles, a sleek and shiny skin, shriveled nails, and sometimes of osteophytes, but principally of the destructive changes taking place in the cartilages of the joints.

Would it not be well to treat these nervous and muscular conditions merely as symptoms and search farther for the real cause? We may all have some pet theory which, if brought to light, might suggest some facts that would lead at least to a working basis for the rational treatment of this until recently incurable disease. Every individual who has inherited or acquired a healthy body, should be able to keep it in that condition by maintaining an equilibrium of metabolism. Just as much material should be absorbed and assimilated from the food as is removed from the body by the excretory organs. The income must always balance the expenditure; wherever a tissue is used up, it should be replaced by the formation of

* Read before the American Electro-therapeutic Association, at the Hotel Kaaterskill, Catskill Mts., N. Y., on Sept. 3, 1902.

new tissue. Where this balance is maintained we have health; when disturbed for any length of time, disease follows, and especially in the tissues, that have been deprived in the meta-



Fig. 1.

bolic process of the material necessary to the repair of their physiologic waste.

The food necessary to perfect nutrition consists of water, salts, fats, proteids, and the carbohydrates.

In speaking of the body as a whole, Volckman and Bischoff state that it contains 64 per cent. of water, 16 per cent. of proteids (including gelatin), 14 per cent. of fat, 5 per cent. of salt, and 1 per cent. of carbohydrates. The carbohydrates are therefore the smallest constituent of the body. They are found

in the glycogen of the liver, in the muscles, and as small quantities of dextrin in various parts.

The muscles form about 42 per cent. of the body weight and contain 75 per cent. of the water, and 21 per cent. of the



Fig. 2.

proteids of the entire body. It is therefore reasonable to conclude that a proportionate quantity of water and nitrogenous food is necessary to keep the body, especially the muscular system, in metabolic equilibrium.

When carbohydrates are taken to the exclusion of nitrogenous food, so far as nitrogen is concerned, the body is in a state of inanition.

By the time that a case of rheumatoid arthritis usually consults the specialist, the patient has already suffered for many months, and perhaps years. The whole aspect is one of in-

tense and long suffering,—anæmia is well marked; the muscles are wasted and degenerated; many of the joints are deformed, inflamed, and tender; the flexor muscles contracted; the skin shining and sometimes cadaverous in appearance, and the joints may be fixed in flexion. Digestion is usually impaired, and may be associated with a foul-smelling breath, poor appetite, and distended stomach and intestines. There may be also an aversion to meats, and a fondness for sweets and pastries, constipated bowels, and a scanty flow of urine, unless, perhaps, their physician has prescribed some special brand of lithia water. In the latter instance the urine will be pale and generally contain far below the normal amount of urea. They will have lived upon starchy foods and sweets for years—perhaps from infancy. In these patients the muscles have been deprived of a large proportion of their proximate principles, and the body has been called upon to furnish a good part of the nitrogen. When we examine the chemistry of the nerves, we find that the proteids comprise about one-half of the solids in gray matter—and about one-third of the solids in the white matter. So not only the muscles, but the nerves as well, are made to suffer, and they degenerate when the proportion of nitrogenous food necessary to nutrition has been constantly excluded from the diet.

We find that in starving animals the loss of weight is greatest in the muscles, fat, skin, liver, and blood, while death occurs from asthenia, sometimes accompanied by convulsions. The same condition, slightly modified, is found in rheumatoid arthritis. We have the wasted muscles, fat, skin, liver, and blood, and instead of convulsions the gradual and continuous contraction of the muscles of one or more parts of the body. The blood vessels carry the impoverished blood to the synovial membranes and the cavities of the joints are often filled with this fluid, which the absorbents are unable to take up and return to the circulation. The cartilage can obtain but little nourishment from the impoverished lymph, hence it softens and breaks down. Nutritional changes often take place also in the ends of the bones. These conditions are liable to go on from bad to worse until the patient becomes a helpless and deformed cripple. Again, the constant use of starchy food produces by fermentation a dyspepsia with flatulence,—gradually distending the stomach and intestines, and causes

a general disturbance of the weak and flabby heart, causing dyspnoea by pressure. The pressure upon the nerve filaments and absorbent vessels of the intestines also interferes with the process of absorption. The imperfectly digested



Fig. 3.

and fermented food renders the function of assimilation very imperfect. The secreting glands are impoverished and do not functionate well—the liver especially. By this alcoholic fermentation of the blood in the intestines an acid medium replaces the normal alkaline secretions that are imperfectly supplied by the liver and pancreas. Normal peristalsis is interfered with, and constipation naturally follows—alternating at times with diarrhea.

These are the conditions existing in extreme cases. The victim of sedentary habits and a vegetable diet is subject to any modification, and instead of rheumatoid arthritis may fall heir to some other chronic disease.

To the outdoor laboring class these facts do not to the same extent apply, for the reason that the muscular labor that they perform produces an activity of digestion and assimilation that is not followed indoors or in persons of sedentary habits. The difficult and complicated process of the digestion and assimilation of starches, sweets, and fats is overcome by increased metabolism in muscular labor—and in the consumption of large amounts of oxygen. The muscles and nerves are enabled thereby to attack and assimilate all of the proteids that are taken into the system, generally enough for their physiological repair. At the same time the carbohydrates are very rapidly consumed by oxidation.

The weak dyspeptic should not therefore be encouraged to consume large quantities of starchy food to the exclusion of good wholesome beef, as has so often been the case, for if physiological investigation proves anything, it shows that these cases require meat—red meat—and plenty of it for the preservation of a healthy physiological balance of the digestive, secretory, and excretory functions.

Rheumatoid arthritis would become a thing of the past, if habit and diet could be corrected, and we would no longer look for a rheumatic or trophic nerve-center disturbance as an ætiological factor. By the judicious use of electricity we are able to increase the local nutritive functions of the joints, skin, and muscles, and also of the organs of excretion and secretion. Thus we bring into therapeutic association two of nature's greatest and most wonderful agents—diet and electricity.

Even in spite of the fact that Dr. Osler, in his "Practice of Medicine," in giving the treatment starts in by saying that "Arthritis deformans is an incurable disease," and closes by saying that "No benefit can be expected from electricity," time has not verified this statement. The disease is curable, even in the advanced stages, and electricity, combined with diet, is the only agent that can be thoroughly depended on for the cure. When cartilage has been destroyed, it will not be possible to regenerate the disorganized tissue, but the muscles may be again brought into action, and the skin can be made to

resume healthy action, the glands of the body to resume healthy function, and those joints to work properly that have not been too far disorganized. The limbs can be straightened, the pains cured, and the patients made comfortable and able to resume their usual vocations.

In the treatment the diet should be as follows: beef or mutton and very little bread, which should be thoroughly baked,—



Fig. 4.

or twice baked, milk, eggs, and water in abundance should constitute the principal foods allowed. .

Static electricity is applied as sparks to the joints, or to the nerves, and also as currents and sparks to the spine. If there is effusion in the joints the writer has been accustomed to apply the galvanic negative current to the boggy surface, concentrating it in such a way as to produce a good-sized blister, and to repeat this operation from time to time. The extensor muscles come in for special treatment by the interrupted galvanic current, and the interrupted induced current. Place the hands and wrists of the patient in a water bath connected

with the negative pole of the battery, while a large dispersing pad covers the greater part of the spine connected with the positive.

Very little medicine is administered. Mild hepatic stimulants may be given from time to time, and if the stomach is very acid, sod. bicarb. in hot water before meals until the diet has an opportunity to remedy the condition.

Many cases have been treated in my office by electricity alone, with more or less success so far as the relief of pain was concerned, but no case of great severity and long standing has been cured by electricity alone. Electricity will undoubtedly do its part, but in addition we must remove the cause, if we hope to cure the disease.

The severity of the following case will be appreciated from a glance at the accompanying cuts of the hands.

The case is of about twenty-five years' standing. The patient is a lady thirty-seven years of age, and at my request she wrote a short description of the progress of her case, which follows in her own words:

"When a mere child I suffered with pain in my limbs and back. When I was about fifteen my joints commencing to enlarge, my physician prescribed different rheumatic remedies, none of which did me much good, but created stomach trouble, thus adding to my discomfort. I had several attacks of la grippe,—after each of which my rheumatism grew worse, until finally every joint in my entire body was affected. My hands were so drawn as to be closed. My arms and knees were quite crooked. Physicians pronounced my case incurable. My system sympathized with my trouble, and I was in a generally run-down condition when, at the age of thirty-seven, I went to Washington and placed myself under your care for treatment. You told me that you had been able to relieve these cases, but had not cured them, but if I was willing to come under your care, you would like to see what you could do with diet, electricity, and a little medicine. I submitted to the experiment and am glad to say that the results have been very gratifying indeed, giving me the use of my hands, arms, and legs, which had been for years gradually leaving me. My general health is better than it has been for many years."

Fig. 1 shows the palmar view of the right hand, forearm, and elbow when treatment was begun. The fingers and wrists

were stiff and immovable, and any effort to force your finger into the hand under the ends of the fingers caused considerable pain. Fig. 2 shows side view of same hand, showing deformity of wrist. Fig. 3 shows the left hand, with the tightly closed middle, ring, and little fingers, with the index finger twisted around and bent over the knuckles of the middle and ring finger. The closed fingers were pressed firmly down.



Fig. 5.

The patient stated that she had not seen the inside of the left hand for 11 years. There was no motion in any of these joints. The shoulder, elbow, hip, knee, and ankle joints were all stiff and had very limited motion, the mouth could only be opened far enough to admit the butt end of a lead pencil. She walked with great difficulty, and could not bring her hands to her head. There was about as much contraction in the flexor muscles of the leg as is shown in the arms. The body was bent forward. The general appearance was that of pain and long suffering. Figs. 4, 5, and 6 will show the condition of the hands after ten months' treatment. Every joint in the body has correspondingly improved. The patient can go up and

down stairs with great ease, and often walks to my office for treatment, a distance of three-quarters of a mile, without fatigue. She combs her own hair, and in fact does most anything she takes a notion to do.

The success of the above case brought another from the same town, that had also been pronounced incurable. He came for treatment on crutches, with legs and body bent



Fig. 6.

almost to a sitting position. This man is now walking wherever he pleases with or without a cane, and instead of the shriveled, cadaverous appearance that he presented when he came to Washington, he has now the bright eye, elastic step, and glow of health rapidly taking its place; his body is straight, and his legs are nearly so. This gentleman has been under very many kinds of treatment, as he has been a sufferer for the better part of his life. He had been for several months at the Hot Springs of Arkansas. He now feels assured of his return to health.

DISCUSSION.

Dr. W. B. Snow said that the subject was of more than passing interest to him, as he had treated upwards of thirty cases of rheumatoid arthritis, many of them with excellent success, and others with relative success, depending upon the conditions found in the early stages. The paper just presented was most excellent, and the suggestions made therein were of the utmost importance. It had been his own practice to uniformly put these patients on a diet largely of meat. He had not used the galvanic current, but was free to admit that better results had been obtained by Dr. Bishop's use of the galvanic current in the cases under consideration than he would have expected from the static machine alone. In joint inflammations there are uniformly contractions of the muscles, extending to or beyond the joints affected, especially of the flexor group. In the most chronic cases galvanism appears to be indicated from Dr. Bishop's favorable results. In the earlier stages, however, before destruction of the interarticular cartilages has taken place, and the conditions present are but swelling and contracture, the case is different. It was his practice to take a skiagraph at the outset, and on this found his prognosis. If the interarticular cartilages were found to have been destroyed, it was evident that the joint could never be very useful; on the other hand, if these cartilages had not been destroyed, a good prognosis could almost invariably be given. He was well aware that this was in defiance of the statements of great medical authorities, but there is at present enough evidence to establish the fact. He thought it behooved us, therefore, to call attention to the error of drugging these patients as with the salicylates and iodides. This was actually cruel and inexcusable, because patients had already impaired digestion, and such medication served to still further upset the function. He had studied his cases with much care, and had come to the conclusion that rheumatoid arthritis was always secondary to some other condition. In some cases the primary condition was found to be Bright's disease; in others, it was a disease of the uterus, or some other diseases which had impaired the general health. He believed that the primary condition impaired the function of the trophic centers, from which cause the rheumatoid arthritis developed. If it was possible to again restore the activity of these centers, it was possible to restore the patient to perfect health. The exact origin of the disease was still a mooted question. The indications for treatment, however, were patent; the improvement of the general nutrition. Electricity was *par excellence* the agent for this purpose, for it overcomes stasis, improves the circulatory conditions, and increases metabolic activity. Since reading his own paper before this

association in 1899 he had made only one or two modifications. At the present time he believed that the body hot-air treatment was for benefit in the treatment of these cases, yet it was not sufficient in itself. He had also of late used the brush discharge for the treatment of the incipient cases, and found that almost at the first séance it was possible to relieve the pain and reduce most of the swelling. A case was mentioned in which a young woman, working in a dry-goods store, was treated only a few times and had been practically restored to health. Cases treated at such an early stage, and nearly all cases within the first two years, could be easily cured, and all can be greatly relieved and brought to a *status quo*.

Dr. D. R. Brower said he desired to thank the author of the paper for his valuable contribution, and to emphasize, as the author had done, the importance of diet. The great Fothergill, whose disciple the speaker said he had been for many years, had done much harm by his mistaken theory of metabolism. The reader of the paper had emphasized the necessity of a nitrogenous diet, and this was the position that he himself had long ago arrived at. Years ago he had become an earnest disciple of Fothergill, but he had learned the error of his ways, and had come to give these patients red meat in abundance. He had also found it desirable to exclude sugar, and to a considerable extent sugar-producing substances. It seemed to him well to make use of colonic flushings because of the pronounced tendency to intestinal fermentation in such cases.

Dr. E. C. Skinner said he was one of those who were on record as believing in the central nervous origin of this disorder. He thought the intestinal, gastric, and other disturbances—trophic, apparently—were secondary to this, but he did not mean to intimate that there was not another condition preceding the disorder of the central nervous system. Nothing was known as yet, however, regarding this primary condition. He agreed fully with what had been said on the matter of diet, and noted that sugar exercised a pernicious influence on many of these patients, but not on all of them. He had not found electricity the only agent of use in the treatment of arthritis deformans; nevertheless it was an extremely useful one. The dry hot-air *body* treatment had proved in his hands a valuable adjunct, though the local hot-air treatment was useless. For most cases it seemed to him necessary to combine both methods of treatment. The hot-air acted as an eliminant, and as a powerful stimulant to the central nervous system. Very few drugs were of service in this disease.

Dr. Willis P. Spring of Minneapolis said he had recently had under his care one very chronic case with marked deformity. She had been previously under the care of an osteopath for over a year. The patient was a girl of sensitive

organization, and besides the deformity in the knee and some other joints, there was an extension into the vertebral column and jaws. Even the mildest spark set the girl crying, so he had resorted to the method of wrapping lead foil around the joint and connecting with the outer coating of the Leyden jar, and using the spark-gap current. This did very well. He had tried the sinusoidal current to some extent, and with apparent relief. On coming to him she could not move one foot from the floor unless it was lifted with the hand or with the other foot. She was under treatment for five months when treatment was suspended for the summer vacation.

Dr. George C. Goodell said that he had begun the use of the hot-air treatment about a year ago, and of electricity since then. Last July a school-teacher had come to him whose father was very rheumatic. She found that she could not stoop down without much pain and crippling. She requested a hot-air treatment, which was given, it being followed by an application of the current from the Kinraide coil. This always gave immediate and complete relief.

Dr. Robert Reyburn said that he had seen one or two of Dr. Bishop's cases, and certainly the effect of his treatment had been very remarkable.

Dr. G. Betton Massey remarked that he had never before seen anything equal to the results obtained by Dr. Bishop, as shown by the photographs exhibited.

Dr. N. C. Nutting, of New Hampshire, said that he had been much interested for years in the treatment of rheumatism, and had found that starch and sugar were very detrimental. It had been his habit to have these patients eat freely of meat and introduce into the system as much fluid as possible. The patient was given a glass of hot water an hour and a quarter before meals, and this quantity was increased to a pint, a pint and a half, or even a quart. It should be taken this length of time before meals because it takes practically one hour for the water to get out of the stomach, and this organ should be given a rest before the meal of at least a quarter of an hour. These patients do not usually like meat, and it would be found difficult to make them take enough. One plan was to take the top of a round steak, trim off all the fat, which they do not like, and separate all the fibrous material. The meat is then run through a No. 10 Enterprise grinder until very finely ground up. A quantity of cold water should be mixed with this meat, which was very important. A little salt and pepper should also be added, and the meat made into balls about the size of a cracker, taking care not to press the meat very firmly. With a little hot butter in a skillet, the meat balls are cooked entirely through, but no effort should be made to brown them. On opening one of these balls, if properly cooked, it would be found that it is the same color throughout, though

it is not brown. Patients who would follow out this treatment in conjunction with the methods described in Dr. Bishop's paper would almost surely be improved.

Dr. Bishop, in closing the discussion, said he was highly gratified at the trend of the discussion, for he had expected to be sharply criticised for the position taken by him. Most physicians insist that these patients shall not take meat. He did not intend to give undue prominence to the dietetic side of the question, but he wished to point out that it was foolish to attempt to treat a disease of such long standing without trying to reach the cause, and he believed the cause was, in most cases at least, abnormal metabolism. He would say that electricity was the only means of treatment for this condition known to him. He had not had extended experience with the hot-air treatment. Some years ago he had kept one of the patients upon an exclusive meat diet, and while her rheumatoid arthritis had improved she had lost considerable flesh and strength. The family urged the hot-air treatment, and this was given by someone in Washington, and subsequently by a practitioner in Philadelphia. Some time afterward she returned to him and was in such bad condition that she had to be carried into the office. Of course, he knew nothing about the way in which the hot-air treatment had been applied.

THERAPEUTICS OF DRY HOT AIR.

BY CLARENCE EDWARD SKINNER, M. D., LL. D., NEW HAVEN, CONN.

Physician in charge Newhope Hot Air Sanitarium, New Haven, Conn., Professor of Thermo-therapy in the New York School of Physical Therapeutics, Member of the American Medical Association, American Association for the Advancement of Science, American Electro-Therapeutic Association, Charter Member Roentgen Society of the United States, Member Yale Medical Alumni Association, etc.

CHAPTER XII.

LOCAL SEPTIC INFECTION.

This is a condition which is pregnant with danger to the victim, and the ordinary methods of management leave much to be desired in the way of results. The ætiological factor here is the invasion of the tissues by pathogenic germs, which produce somewhere during the cycle of their existence poisonous substances—ptomaines—which are absorbed into the circula-

tion and exercise a most viciously depressing influence upon the vital nerve centers. Nature's chief weapon for resisting this invasion consists of the process known as leucocytosis, whereby the infectious focus is walled off from the rest of the body by the formation of inflammatory tissue. It is also probable that some at least of the noxious micro-organisms are directly destroyed by the white blood cells.

When the body temperature is raised hyperleucocytosis obtains. Friedlaender has found that the increase amounts to twenty-five per cent. sometimes, with moist hot-air treatments which raised the body temperature from 2° to 3° F., and this becomes even greater when the medium surrounding the patient is dry, whereby the evaporation of the sweat is facilitated instead of impeded. Dry hot-air body treatments thus give us the assistance of nature's most effective means of resisting microbic invasion.

Another very powerful help furnished by dry heat of sufficient intensity is the profuse perspiration induced. This secretion carries out with it a certain proportion of the toxins present, and the nerve centers are thus relieved from the amount of depression represented by the amount of toxin so excreted. The stimulation of the processes of oxidation throughout the body dependent upon the treatment calls to our assistance also the lungs and kidneys, and the irritation of the nerve endings in the skin arouses the whole nervous system to renewed vigor of function. We thus secure not only a most active resistance to further invasion, but at the same time a most active elimination of the noxious products of the invasion that has already taken place.

Finally, in the case of the local treatments at least, we secure an inhibitory influence upon germ growth by raising the temperature of the invading micro-organisms and their pabulum at the primary focus of infection, whereby the virulence and profundity of the general toxæmia are diminished.

The writer's first experience with hot air in the treatment of well-marked local septic infection was on September 11, 1900. A patient was admitted to the sanitarium on that date who had developed a septic process from a cut on the little finger of her left hand two days previously. She had suffered intense pain for thirty-six hours, temperature had reached 103.5° F., pulse 112, and

marked prostration was present. The hand and wrist had become involved, and red streaks followed the lymphatics up the arm nearly to the elbow. A local hot-air treatment was administered in the hope of relieving the pain, which it accomplished in forty-five minutes, and the patient slept for the first time in twenty-four hours. That evening, to my intense surprise and gratification, the patient's temperature had dropped to 99.2° F., the pulse to 60, and the pain had not returned to any great degree.

By the next morning the swelling and redness had nearly disappeared, but the temperature had risen to 101.4° F., the pulse to 84, and the pain was considerable again. She was given a body hot-air treatment. The pain in the affected hand and arm was relieved during this procedure and did not return again sufficiently to demand another local treatment, and, to make a long story short, the affected members progressed to a complete and fairly steady recovery during the next four days, at which time the temperature reached the normal point and stayed there.

Since then the writer has treated all of his septic cases with this agent and with the same satisfactory results, except that the relief of pain has not always been as prompt and lasting, and in the severer cases, of course, the time required for complete recovery has been longer, sometimes as much as three weeks. This latter, however, amounts to very little when we consider the small chance of recovery in any length of time which the victim of ordinarily severe blood poisoning has under other methods of treatment.

When the case comes under observation while the process is still confined to a limb, local treatments of the limb are usually sufficient to effect a cure. The technique does not differ from that usual to the local treatment, and the temperature should be run up to 300° F. or 350° F., according to the tolerance of the patient.

If the septic process has invaded the lymphatic glands of the joint that connects the limb with the trunk, if much general toxæmia is present, or if the patient does not respond at once to the local application, the body treatment should be used. The technique is that usual to this treatment, except that we cannot use the temperature of the patient as a guide to the duration and intensity of the application, because it is usually

considerably elevated when the patient is placed in the apparatus. The pulse also is not entirely reliable as a guide. We have to be governed more by the effect upon the organism as a whole, and the instinct which is the result of experience is most valuable in this connection. In general, however, it may be said that the treatment should last not less than twenty minutes, and the temperature required will vary from 250° F. to 350° F. The response on the part of each individual patient at each séance will govern both intensity of the heat and duration of the application. As a rule it will not be wise to push the pulse above 140 beats per minute, and the symptoms noted under "Technique of the Body Treatment," as indicating excessive stimulation, should be carefully avoided.

A point deserving of consideration in treating these cases is that when a patient has been severely septic for several days, as many have been before they are given the benefit of hot air, his nervous system exhibits the irritability of depression to a marked degree, and he is not able to endure the body treatment for half an hour. Under these circumstances the heat should be run up quickly, for instance to 300° F. in fifteen minutes. By this means a quick and effective stimulation may be induced before the patient's endurance is exhausted, whereas, if the temperature ran up as slowly as would ordinarily be the case, it would not be possible to secure the necessary deep reflex response without forcing the length of the treatment beyond a judicious limit.

It is not necessary to protect operation wounds with more wrappings than the rest of the body, and the proper surgical dressing will ordinarily be sufficient. The healing of the wounds is greatly hastened by the treatments.

Electricity never enters the therapeutical problem when hot air is available, except to assist in healing sluggish sinuses after operative interference. Here the negative pole of the galvanic battery applied to the offending granulations through a bare metal electrode, using from three to five milliamperes of current, will do more execution than any other measure with which I am familiar. Care should be taken not to use enough current to cauterize. The good results are effected by electrolysis, not by cautery.

Operative interference will be necessary when glands or other structures have been disintegrated beyond the possibility

of recovery and suppuration becomes inevitable. Hot air must not be expected to remove pus. Its great functions in suppurative cases are to relieve pain, prevent the infection from spreading to contiguous structures, lessen the systemic toxæmia, and hasten the repair of damaged tissues. These it accomplishes nobly and well.

Drugs are useful to keep the bowels open and to correct digestive derangements, magnesium sulphate for the former and digestive ferments with small doses of strychnia for the latter. It is very rarely indeed necessary to give them to relieve pain or for stimulation, after the administration of hot air is begun. The management of the diet does not differ in any particular from that ordinarily indicated in this condition.

The advantages exclusively dependent upon the use of hot air in local sepsis are as follows.

First, Rapid relief of pain.

Second, the induction of hyperleucocytosis, whereby the infective process is frequently abruptly arrested, and nearly always prevented from spreading from structure to structure.

Third, relief of the nerve centers to a large extent from toxin depression, because of the increase in the process of elimination.

Fourth, the avoidance of reaction from drug stimulation, because an amount of depression sufficient to demand the same does not ordinarily obtain after the administration of hot air has been commenced.

A NEW COMBINED ELECTRIC ARC AND INCANDESCENT RADIANT LIGHT AND HEAT BATH.

BY SIGISMUND COHN, M. D., NEW YORK,

Member of the Faculty of the New York School of Physical Therapeutics, American Medical Association, County Medical Association, American Electro-Therapeutic Association, German Medical Society, etc.

This light-bath is a combination of incandescent and arc lights. They can be used independently or in combination. The incandescent lamps in the bath with their majority of heat rays are used when we prefer the heat effect upon the patient, while the arc light bath is used if we desire the chemical effect of the rays.

The entire apparatus consists of an octagonal cabinet of such a height that a grown person may stand erect inside. The smallest diameter is three feet. Four sides of the octagon are twice as long as the others. The shorter sides are provided with extension chambers, reaching from within thirty inches of the base to the top of the cabinet. The front of the cabinet has a door for the entrance of the patient. This door is subdivided into a number of sections, any one of which may be opened independently of the others, for communication with the interior of the cabinet, when it is desired to feel the pulse, or to inspect the patient, or observe the thermometer. The top of the cabinet has a central opening. In this opening an exchangeable disk revolves, the patient either stands erect inside the chamber or may be seated on a revolving and reclining chair, which can be easily adjusted to a suitable height (Fig. 1). This chair can also be placed upon a removable platform in a position allowing the head of the patient to protrude through the central opening. When this is done, the solid disk is exchanged for one with an opening for the patient's neck. The anterior part of the roof is hinged for the more easy entrance of the patient (Fig. 2).

The removable platform on which the patient sits consists of two parts, one stationary and the second revolving upon it, so that the patient may turn himself into any position in relation to the lamps, the disk in the roof revolving with him when his head protrudes.

The stairs shown on Figure 4 are for the easy access of the patient to the elevated platform.

The cabinet has eight vertical rows of circular openings, six rows of which have eight openings, and two rows six—sixty in all. Opposite to these openings, on the outside of

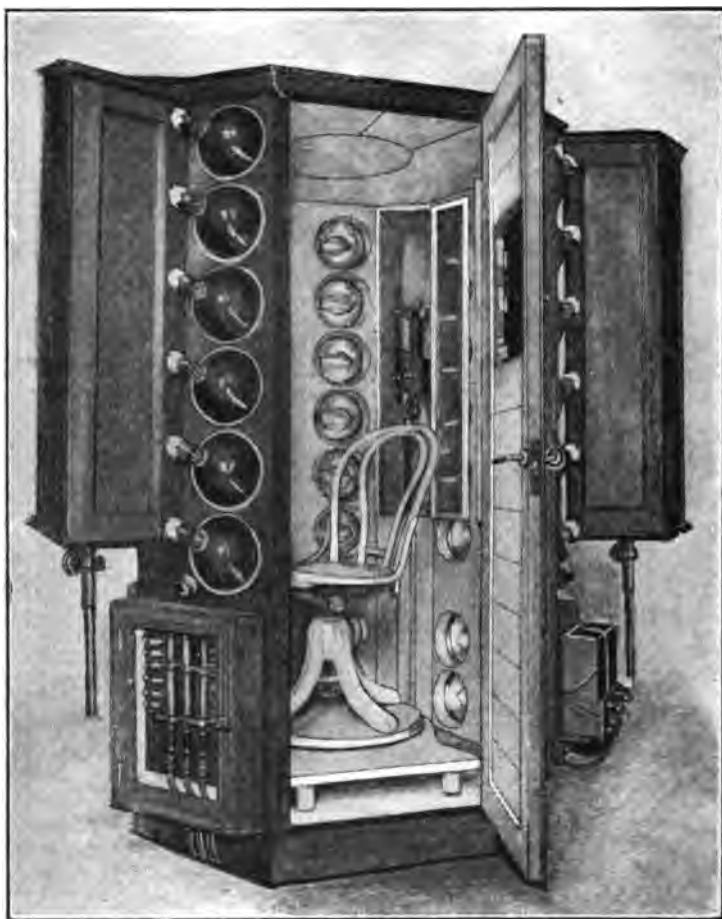


FIG. 1. Front View, Arranged for the Patient to Sit Entirely Within the Bath.

the cabinet, are an equal number of incandescent lamps, covered by parabolic aluminium reflectors, which throw the light from outside into the cabinet. These lamps and reflectors are fastened to ledges in such a way that the lights can be brought nearer or farther away from the openings of the cabinet. The ledges can be tightened so that all ventilation is excluded, and

in this way we will get the combined effect of a radiant heat bath and a hot air bath. (See Fig. 5.)

In the four corner extensions, arc lamps of special design are placed. By a rheostat, which is fastened to the outside

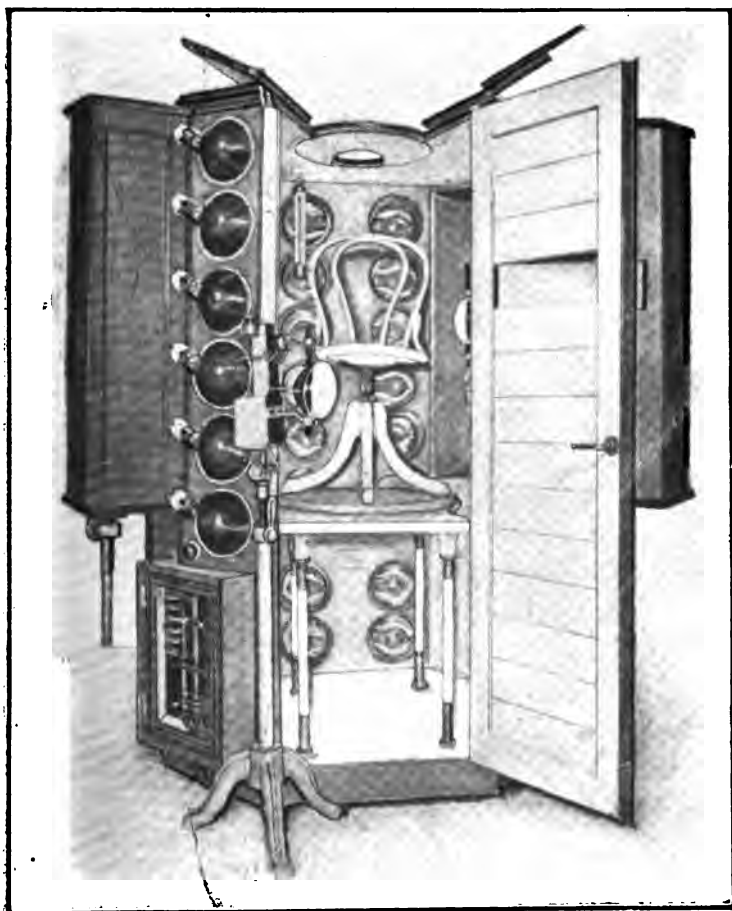


FIG. 2. Front View, Arranged for the Patient to Sit with Head Outside.

of the wall, the current can be regulated from five to thirty amperes. These lamps are also provided with removable parabolic reflectors, which can be raised and lowered and turned in every possible direction, and so held. All this can be done from the outside of the cabinet by means of a door in each extension chamber. If the arc lights are not used, the

extension chambers are closed by corrugated mirrors on hinges, which give a good reflecting surface for the incandescent lights. Each of the arc lamps can be removed from its chamber, and placed upon a special stand. Tubular shells

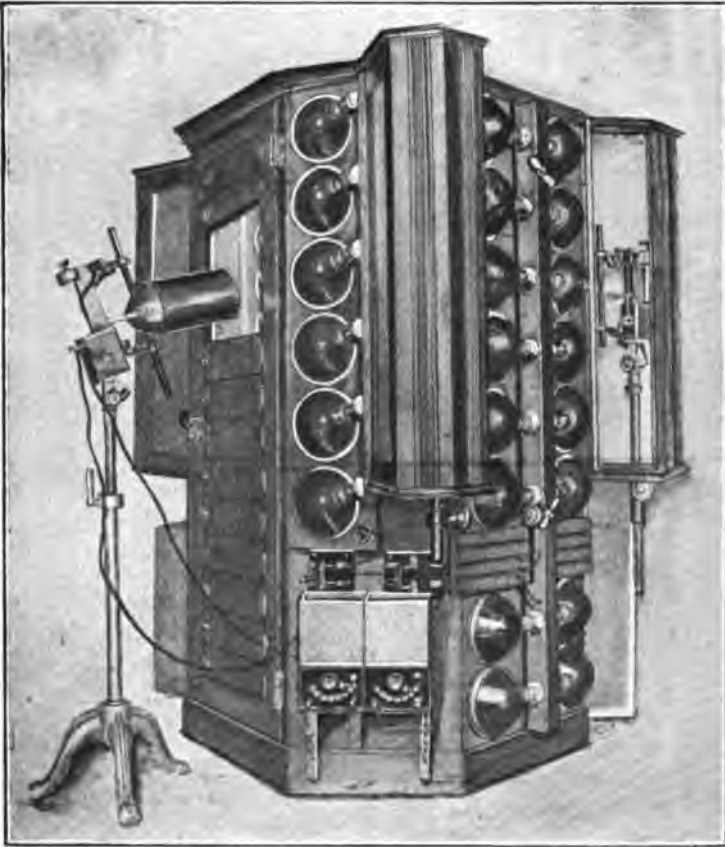


FIG. 3. Side View, Showing Arc Lamp (with Tubular Shell) on Stand for Throwing Actinic Light upon the Patient in the Cabinet.

may be attached to the arc lights, transforming them into ideal searchlights, and can be used either outside independently of the cabinet, or the lights can be thrown inside the cabinet through the little doors of the front door, as indicated in Fig. 3. Colored screens can be placed in front of the arc lamps, so that only the blue or any other colored rays will be thrown on the patient.

The arc light bath can also be used as an ozone bath, by a combination with a static machine or coil. Two holes below the platform allow the entrance of two electrodes, which are heavily insulated in order not to lose the current, and by the

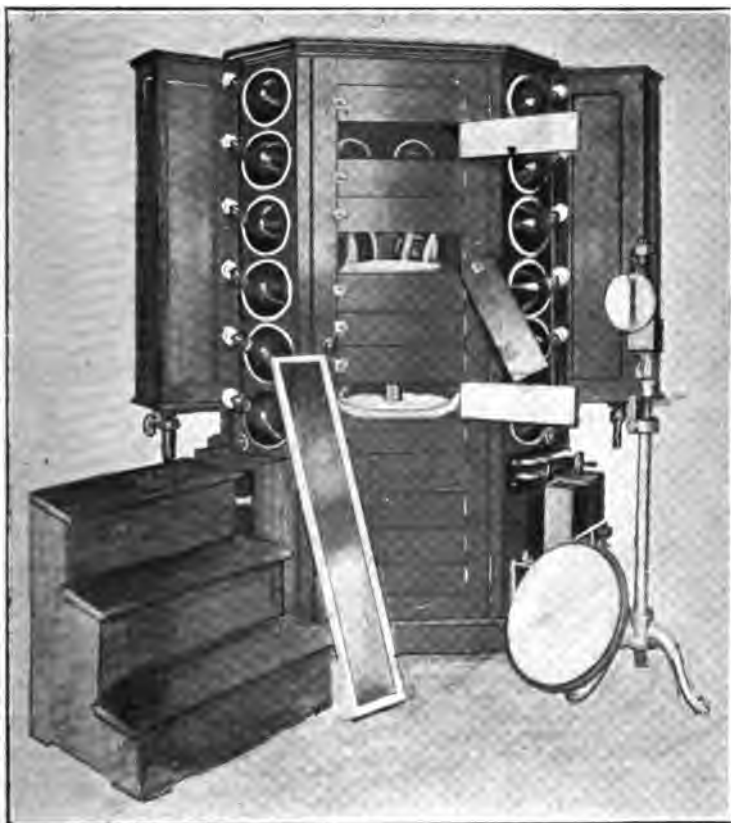


FIG. 4. Front View, Showing Bath Closed, Showing Arc Lamp, Solid Disk, Corrugated Mirror and Steps.

combined work of both we will get a rapid ozonization of the cabinet.

The advantages of this improved light bath are: 1st. By the arrangement of the lamps outside the cabinet, no injury can occur either to the patient or to the lamps. 2d. A most effective regulation of temperature inside the cabinet (see Fig. 5) is provided as the entering cool air will be heated before it reaches

the interior of the cabinet, as it passes the hot lamps. In this way it is possible to regulate the temperature within the cabinet at from 80° or 90° up to 150° , or even more if desired. Very weak patients can take such a bath without any fear of collapse. 3d. We can get a most perfect system of ventilation, which can be varied at will. The size of the openings may be regulated by varying the distance of the lights from the holes, thus admitting any quantity of air desired. 4th. The powerful effect of the actinic lights on the whole body. with the ability to select the blue or any other color. 5th. The combination which allows the head to be inside or outside of

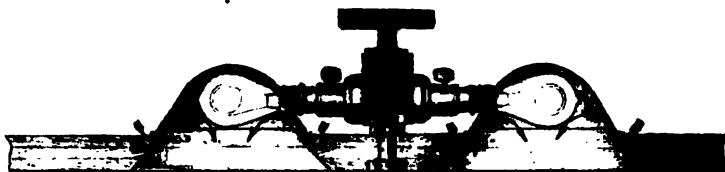


FIG. 5. Section Through Wall, Showing Arrangement of Lights, Reflectors, Movable Ledge, and Provision of Ventilation.

the cabinet. 6th. The possibility of throwing a powerful searchlight into the cabinet on certain parts of the body, which at the same time may be under the influence of the incandescent light bath, giving an enhanced effect. 7th. The combination of incandescent and arc lights inside the cabinet. 8th. Powerful ozonization. 9th. Easy adjustment of position for the patient by the employment of the movable platform. 10th. An ideal radiant heat bath by having the lights outside of the cabinet at any distance and at the same time preventing the air inside of the cabinet from becoming heated, thus creating a perfect circulation of the air from the outside to the inside. 11th. It is also possible to give a combined radiant heat and hot air bath by tightly closing the reflectors to the holes in the walls. 12th. Easy operating of the apparatus from the outside, as any lamp or section of lamps may be employed at will.

116 East Seventy-ninth Street.

THE RATIONAL BASIS OF ELECTRICITY IN GYNECOLOGY.*

BY G. BETTON MASSEY, M. D.

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That electricity is a valuable remedy in gynecology is affirmed by the experience of any physician who uses this agent intelligently in this class of troubles. Before reviewing briefly my own latest technic in this work I wish to say a few words concerning the reasons why this agent is not only of more general value in gynecology than in any other anatomical division of special affections, but probably also the best general remedial agent in gynecology.

Broadly speaking, this particular applicability of electrical currents in gynecology is based on the fact that it is rationally and clinically indicated in a large number of the commoner pelvic ailments of women. Why is this? Because the great majority of women who consult the average practitioner for chronic pelvic symptoms suffer from affections that may be classed in one or more of four great pathological conditions, in each of which electric currents are of value and easily applied. These four pathologic conditions may be called developmental imperfections of function, post-infective disorders, trophic affections, and neural disorders.

Developmental Imperfections of Functions.—In the first class we of course find the menstrual disorders of girls and young women. I need not tell you that the ordinary view of menorrhagia, which attributes it to obstruction, is a gross error. No accumulation, or adequate closure of the uterine canal is ever found. In the worst cases we may have a post-infective disorder also to deal with, an uterine catarrh, but with or without this attendant feature the pain is due to an attempt at the performance of function by an organ inadequately prepared for the work. Hyperæsthesia of the canal, the usual intermenstrual feature, is but one indication of the relation of the spinal nerves to this affection of the pelvic sympathetic system. The main purpose of the electric treatment of menorrhagia or dysmenorrhea is the promotion of a healthy circulation in the

* Read before the Clinical Society of the New York School of Physical Therapeutics, Friday evening, Dec. 19, 1902.

pelvic sympathetic ganglia, and no other agent accomplishes equal results.

Post-Infective Disorders.—As the woman becomes older, and her pelvic organs are called on to perform the greater tasks of life, often under disadvantage of dress and hygiene, general and local, we have the purulent infections to deal with. Viewing the least serious of these, the common inflammations from taking cold and tramatism, and not referring here to the acute stages, if any, we have to deal, in the ambulant patient, with many forms of post-infective tissue changes, all due to an inability of the part or organ to throw off the débris of the microbic-phagocytic contest constituting the original affection, and often to a continuance of this process in subacute form. What does it matter where this process is located, whether uterus, tube, or ovary; so long as the pathologic condition is a subacute inflammation the real disease must be attacked, not the unfortunate organs in which it is situated. Though the process of stimulating tissue by electricity will vary with the variation in present seat of the subacute inflammation, the value of the agent consists in a similar stimulation of errant metabolism, or in actual sterilization by cataphoresis, whether we deal with endometritis, metritis, salpingitis, ovaritis, or perimetritic deposits.

Trophic Affections.—And how many common disorders of mature women will be left when we cull out the post-infective and the trophic disorders, the latter succeeding the former in so many cases, and giving rise to the troubles called displacements, relaxations, etc.? Even new growths, such as fibroid growths of the uterus, come under either this designation or that of infections. Added to the well-known value of electric currents in trophic disorders we have their special case of application to gynecologic work, for the parts, being insensitive, permit more effective currents to be used than any other parts of the body.

Neural Disorders.—I shall not enumerate the bearings of the nervous system on pelvic complaints. The subject is too large for the time at my disposal, but I may say that it is by no means confined to neuralgias and other purely nervous affections of local or general origin, such as neurasthenia, hysteria, etc., but permeates all of the affections already enumerated and more. It is difficult to estimate the value of

electricity in alleviating this feature of pelvic disorders apart from the physical derangements, but in the use of this agent in doubtful cases we can feel assured that both horns of a diagnostic dilemma are equally and effectively provided for. Of its value in sexual impotence alone, both neural and muscular, volumes could be written, yet the great works supposed to deal with gynecology often fail to mention either this disorder or its remedy.

I wish now to exhibit and describe a number of instruments.

The Dispersing Pad. The dispersing pad should usually be as large as the abdomen, and should contain as much water as possible without the water running off. There should be half an inch of water between the skin and the metallic conductor. The pad I exhibit is made of eight or nine layers of absorbent cotton covered with cheese cloth, to the under side of which a flat spiral of brass wire has been previously sewn, the end of the wire being brought out and twisted about its cord tip to make a friction socket. For a current over 80 ma. the dimensions should be at least 12 by 8 inches.

Vaginal Instruments. Of late years I have made use of a brass electrode covered with absorbent cotton for most vagino-abdominal applications. It is a large olive-bulbed instrument, and the shaft is insulated by means of black sealing-wax, which should be re-fused and sterilized in the Bunsen burner or alcohol flame, as I show you, before each application, securing perfect insulation and perfect cleanliness at once.

This same instrument, or one with a large bulb of zinc, is also used in permucous cataphoric applications to diseased adnexæ by leaving the absorbent cotton off and freshly amalgamating the brass or zinc bulb with mercury before each application. In this use the instrument is of course always connected with the positive pole.

I am sure that a large proportion of tubal and ovarian disorders may be saved from operation by the use of this method. From 50 to 80 ma. are employed for five or six minutes tri-weekly, the mercuric oxychlorides produced being gradually driven into the affected region along with some of the holding metal. Irritation of the vaginal mucous membrane results, leading at times to increased tenderness, and this is greater if the electrode be of zinc, but this counter-irritation probably adds to the effect. The applications may be made daily or at

somewhat longer intervals. Some of the patients showing considerable irritation of the vaginal mucous membrane do not complain of this, but, on the contrary, are relieved of their symptoms. Usually the menstrual function will be arrested for a month or two as a result of this treatment.

Intra-Uterine Instruments. The first intra-uterine instrument I shall exhibit is a flexible one made of platinum. This has been often described. After using the mercury as described and nearly curing the patient, it is often well to make use of intra-uterine treatment to cure a residual endometritis. This instrument, in my present practice, is first coated with a very little cotton, as an applicator, and is then moistened with water and synol soap solution. After the removal of the instrument, the cotton must not, of course, be pulled off, for this would break the fragile tip. It is best to work it off with a brush in flowing water. It is sterilized by the flame before use. When this instrument is removed from the uterus the cotton shows the condition of the cavity. I have here several other instruments—for example, a Simpson uterine sound adapted for mercuric applications to the uterine cavity with the tip amalgamated and the shank insulated with soap. In the treatment of uterine fibroids I am now using, in connection with the intra-uterine instruments, a current of from 80 to 150 ma. continued for four minutes, and whenever the application is positive, mercury is employed on the electrode.

Treatment of Tubercular Glands of the Neck. I recently read in the *Journal of the American Medical Association* how the neck could be slit down and the external carotid artery tied, if necessary, for the removal of tubercular glands of the neck. This seems to me horrible, when I know that any average practitioner with a dozen ordinary bell-ringing cells and a little mercury and zinc can cure such a case, leaving almost no scar. In the first place, a needle puncture is made under a spray of ethyl or chloride. A small sliver of thin zinc is cut and smoothed down with a jeweler's file. The zinc sliver is then connected with a conducting cord made of No. 28 copper wire. This tiny electrode is next amalgamated and inserted under the skin. A drop of cocaine solution is applied around the tip of the instrument. A current of from 1-2 to 3 ma. is then turned on for fifteen minutes, and on the removal of the zinc sliver there will be left in the tissues a small cylinder

of necrosed tissue. A new sliver of zinc must be used each time, for the zinc becomes too brittle to use more than once. A few days later, a second application is made, the electrode being insulated after the first application with sealing-wax except at the tip. The tissues are so thoroughly sterilized by this treatment that there is no necessity for applying any dressing. Each treatment should last for fifteen minutes or thirty minutes, and the current should be that which the patient can bear—say, 1-2 to 3 or 4 ma. In these cases of tuberculous glands of the neck the indifferent, negative, electrode is usually placed on the abdomen or back. I have now four of these cases, completely cured, and one nearly cured. The first two cases required respectively 11 and 22 treatments, but after that I had a case which took a year. Usually I treat only one gland at a time. In these tuberculous cases, when there is an opening, a current of 15 to 20 ma. can be used without hurting the patient. It is well to apply cocaine solution for a few minutes before beginning the treatment, after an opening has been made. In one very unruly boy it became necessary towards the last to give chloroform, and then I used at once a current of 50 ma. His health is now perfect, two years later, and the scar scarcely noticeable.

Mercuric Electrodes for the Treatment of Cancer.

I wish now to show you the electrodes which I use in my method of treating cancer of the breast by mercuric cathaphoresis. I prepare for such an operation 24 electrodes, each electrode attached to a No. 28 piece of insulated copper wire, and the whole are divided by plaiting the wires into groups of six, for convenience of handling.

In answer to questions Dr. Massey said:

Some patients have complained of tenderness in the vagina after a month of mercuric treatment, while others have received daily treatment for months without discomfort. When discomfort is produced I make use of the faradic current for a time. No vaginal tampon or other application is used after the electrical treatment, and the patient is instructed simply to use hot water for comfort. The suppression of menstruation, to which I referred, is very commonly observed, but it will pass off after the cessation of the electrical treatment.

Dr. G. Betton Massey: It seems to me that one explanation

of the difference in these electrodes depends upon the varying quantities of water which they contain. I would ask if electrolysis does not take place here in all cases from surface to surface. When there is more water there will be more chemical energy developed against the skin. This would seem to fit in with the idea that Dr. Brown's electrodes give a harsher sensation. The electrode is heated in order that, by drying, it may become more absorbent to water. I think this is a possible explanation.

I pointed out some time ago the importance of covering the face or the bald head with a woolen covering if it is desired that the spray current shall go to that part of the body. This is because a dielectric is interposed. A case of rheumatism of the eye first directed my attention to this subject. The patient was a lady, and when the current was given in the ordinary way all of it would go to her eyebrows and hair. I covered the eyes with a band of plush and was surprised to find at the end of the treatment that the underlying skin was red. I am now using a modification of this. Two balls of surgical wool are employed, one over each eye, the nose being covered with tin foil, and the whole kept in place with a silk thread. The patient holds in her hand the chain attached to the positive pole of the machine. The aigrette is held near the face. After about 15 minutes the skin over the eyelids becomes quite red. I would suggest that this method might be employed in connection with the treatment of indolent ulcers.

Professional Building.
Philadelphia, Pa.

Editorial.

CHOICE OF X-RAY TUBES.

THERE is a disposition on the part of the makers of X-ray tubes to become careless in the selection of the metal parts and glass employed in the manufacture. The great demand for tubes which followed the discovery of the value of the X-ray in the treatment of cancer has been the cause for some carelessness. In the earlier manufacture of tubes it was considered essential that the anodal plates be made of platinum, but the disposition is now to use cheaper materials. They soon become perforated, permitting many of the cathode rays to pass through and thus become unavailable. To this condition (the quality of the anode plate) attention is particularly called, when selecting tubes—experience will demonstrate these defects. Some writers advise the selection of adjustable tubes, which are valuable for the reason that, with skillful management, the life of the tube may be greatly prolonged by preventing the tube becoming so high that it is apt to puncture.

Other tubes may be easily lowered by placing them upon a sheet of asbestos, or a pan of ashes, in a hot oven for from fifteen to thirty minutes. As a rule, never buy a tube having a high vacuum, but a low one, in which the anode plate will not become red, except when a powerful current is passed through the apparatus, if a coil, or one for static machines which will not glow until the interrupters are widely open, or a series ball interrupter, with as many balls open in series as the current will pass with the machine running at a rapid rate of speed. Such a tube becomes higher less rapidly, and well serves from the first for therapeutic use in all but the deep-seated forms of malignant disease. A tube from which there is absolutely no fluorescence from a static machine when the interrupters are closed, will do valuable service when properly managed with

the series ball interrupters, and be of service for a long time with little danger of being punctured—a matter of much importance to X-ray workers.

Tubes for raying within cavities are coming rapidly to notice. A particularly novel tube is the one shown in the last JOURNAL—a tube without an anode plate, but in which an extremity of the tube placed opposite the cathode becomes the target, a water bath being necessary to protect the patient from the heat and prevent the tube from puncturing. If such tubes are employed great care must be observed; for we must bear in mind when the tube is placed within a cavity, that the rays are very near the tissues. One or two minute periods of exposure will be sufficient, and should be administered with caution.

It is also advisable to place about such tubes a shield of metal, except to parts where the use of the rays are indicated.

* * *

COMMON ERRORS OF DIAGNOSIS AND TREATMENT OF NEURITIS.

THE number of cases of neuritis that finally fall into the hands of the specialist, after having been treated for months for rheumatism, is certainly a reproach, either to the general professional ability to make the diagnosis or to provide an efficient method of cure. The fact that the notion is generally prevalent, that neuritis of the sciatic traceable either to the cord, plexus, or some of the branches of distribution, is of rheumatic origin, is evidenced by the far too common term, "Sciatic rheumatism." For in more than seventy-five per cent. of the cases of sciatica and brachial neuritis no rheumatic history is present. In such the employment of anti-rheumatic remedies is absurd, and the indication apparent either of the ignorance of better methods, or the willingness to impose upon the good nature of the sufferer.

The differential diagnosis between neuritis and rheumatism

is not difficult when the absence of local swelling, heat, and redness, as well as the localization of the pain in the joints are absent as they are in the former: the pain, numbness, and tingling extending to the distributions of the affected nerve trunks. Patients in more than ninety-five per cent. of cases of neuritis, wherever located, may be cured by forms of static treatment in a period relative to their duration—the recent cases in from one to two weeks, and those which have become infiltrated with deposits of fibrin or other inflammatory products in periods varying according to the conditions present.

Either the wave current, sparks, or brush discharge will cure many cases; others may require them all, with diligence and careful regulation of frequency of administration. All curable cases however can be made relatively comfortable from the first administration and eventually cured. But a small percentage, associated with bone necrosis, exostosis, malignant disease or other extraneous cause, will resist the static treatment.

The above statements are correct, and yet but a small percentage of neurologists and other practitioners of medicine are prepared to accept them. Would it not be fair at least for such to investigate?

* * *

THE RECENT MEETING OF THE AMERICAN ROENTGEN RAY SOCIETY.

THE interest manifested by the large increase in membership at the recent meeting of the American Roentgen Ray Society and the number and excellent character of the papers presented are indicative both of the great interest taken in the subject of the X-ray in medicine and surgery, as well as of the substantial character of the organization.

Progress in Physical Therapeutics.

GYNECOLOGY AND APPLIED METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D., PHILADELPHIA, PA.

ASSISTED BY MARY L. H. ARNOLD-SNOW, M. D., NEW YORK.

OCILLA, GA., December 9, 1902.

Editor **ADVANCED THERAPEUTICS:**

I have this day discharged a case of pelvic adhesions of over thirty years' standing, complicated with chronic inflammation of the bladder; as far as can be discerned, perfectly cured.

This is an interesting case, from the fact that, in its incipency, an operation was performed on her by our honored Battey of Rome, Ga., twenty-five years ago, without any material results.

A few years after this she was treated by one of the most eminent surgeons of our State with about the same results.

The case has been handled by eighteen other physicians of note, and if anything, she grew worse under the treatment, and was finally relegated to the rolling chair, where she has spent the greater part of the past thirty years.

On 15th of last April I arrived home from Philadelphia, where I had taken a course in Electro-therapeutics in the office of Dr. G. Betton Massey, of that city, and on the 17th day of May I induced her husband to bring her to me for experimental treatment.

On examination I found one of the most profound cases of indurated adhesion of the entire pelvic viscera I ever saw, except one that was under treatment by Dr. Massey, while I was in Philadelphia.

I felt certain, though a novice, from the demonstrations that I had seen of the power of the cataphoric galvanism, I could do something for this poor sufferer.

I commenced treatment by mercury-covered electrode, on left side, alternating from side to side, three times per week, of seven minutes' duration, of from fifty to seventy-five milliamperes followed usually by negative faradic currents, for four minutes, after which, the static breeze was given for fifteen minutes.

I gave in all forty vaginal applications and eleven bladder treatments of fifteen milliamperes, positive, followed by faradic negative.

At present the womb is perfectly movable, and no trace of indurations or adhesions can be distinguished.

Now in conclusion will say, this lady, fifty-two years of age, who was taken from the rolling chair and brought to my office on the 17th day of last May, walked from her home to my office, a distance of one and a half miles, and took her last treatment.

I could give a record of many other cases treated by cataphoric galvanism successfully, but this being such an obstinate case I think it will suffice to demonstrate the efficacy of cataphoric work.

Respectfully,

J. E. GOETHE, M. D.

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

The Symptomatology of Calculus, Renal and Ureteral Disease.
Chas. Lester Leonard, Philadelphia, Jour. Amer. Med. Asso., October 18, 1902.

This is a well-written paper, read at the Section on Surgery and Anatomy, at the last annual meeting of the American Medical Association. In quiescent calculi is a danger of not detecting, and hence of not making the correct diagnosis. The examination with the sound and consideration of the symptoms may not detect the stone. There are difficulties even in estimating the value of urinary analysis. He reports cases—may it not be well in doubtful cases to make a careful examination with the cystoscope—illuminated by a strong electric light.

Intrapubic Section for Prostatectomy. E. Wyllys Andrews, Chicago, Jour. Amer. Med. Asso., October 18, 1902.

Another carefully written paper is published in the same section of the Journal of the American Medical Association. The author describes the different structures causing the obstruction, and his reasons for so selecting the route for the individual operation; his reasons for selecting the intrapubic route, and makes the following conclusions:

1. The narrowness of the male pelvic outlet becomes surgically important with the overgrown prostate.
2. Overgrowth of prostate does not cause obstruction unless there is also outside pressure.
3. This may come from the ligaments and muscles without the organ actually pressing upon the ischia, or from bony pressure.
4. Relieving the prostate from the fixed space behind the pubes allows it to expand and cures the obstruction.

5. This can be done best by an anterior incision, and should be accompanied by a cutting of the prostatic ring and removing a segment extra-urethrally.

6. Incidentally the change of position, lowering the bladder outlet, does away with the retroprostatic pouch, and greatly assists natural drainage.

7. The separation of the prostatic and urethral ligaments from the pubes and the weakening of the uro-genital diaphragm is not to be avoided, but sought.

Chronic Urethritis is the title of an able article in the Critique, page 334.

This malady is not self-limited, and must be scientifically treated, particularly that form which is called generally specific.

It is not a local disease, and the bacilli spread in all directions into the deeper urethra, as well as into the tissues. Other sequelæ, as a stricture of the urethra, may follow. The article recommends for the treatment of the stricture "electrolysis," as a chemical absorption, and not, as some individuals erroneously express it, a dilatation.

The Modern Treatment of Urethral Strictures. Medical Record, New York, January 3, 1903.

This was the subject for special discussion at a meeting of the New York County Medical Association, held December 15, 1902. The principal paper was read by Dr. J. W. S. Gouly, who favored gradual dilatation of the strictures, using extreme gentleness, care, and perseverance. It was followed by Drs. L. W. Hotchkiss, Parker Lyons, E. L. Keyes, Jr.; Fred C. Valentine, Jos. D. Bryant, Wm. A. Shufeld, and Robert Newman. The latter spoke of his successful treatment by electrolysis, the ideal treatment by dilatation, complimenting Dr. Gouly. Each speaker related his particular experience with the different ways of treatment. The report of this discussion is well worthy of perusal.

Subcutaneous Rupture of the Kidney, with Report of Nine Cases. George E. Dodge, Annals of Surgery, Philadelphia, December, 1902.

The diagnosis of these cases is difficult. Pain and hematuria are suspicious symptoms, but such are present in other diseases. If it is caused by traumatism, the symptoms follow, but are not constant. We know of a case which was diagnosed only by the patient, who was a physician. He suffered off and on, and died nine months after the accident. An autopsy proved that the patient had made the correct diagnosis.

The author of the paper has not reported a case of so long duration, which ended fatally.

Failures in the Irrigation Treatment of Gonorrhea. Dr. Fred C. Valentine, Amer. Medicine, Philadelphia, December 20, 1902.

There are some cases cited for the failures, which principally are: congenital defects of the parts, or acquired complications; the presence of phosphaturia and the idiosyncrasy of the physician. He also states that the irrigation with permanganate of potassa will not cure all cases.

Light Treatment of Male Urethra. Licht-therapeutische Neuigkeuter. H. Strebel, Deutsche Medicinische Wochenschr., Leipzig, September 25.

The author thinks he has invented a reaction by the application of phototherapy to the male urethra. He thinks that this is the first step toward successful radiotherapy of gonorrhea, and other affections of the urethra. The inflammation induced lasted for five hours and extended for 12 cm. into the urethra. He uses an iron lamp and apparatus of his own invention and experimented upon himself.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Serum Therapy in Laryngeal Diphtheria. In laryngeal diphtheria our main diagnostic guide is the clinical course of the disease, characterized by symptoms referable to the larynx, viz., the characteristic cough, hoarseness, and symptoms of stenosis. (Adolph O. Ffingst, American Practitioner and News, September 15, 1902.) These cases cannot so easily be mistaken for other conditions; certainly not as frequently as simple tonsillitis and diphtheria are mistaken one for the other. The statistics of laryngeal diphtheria, therefore, appear to me more convincing than those of the faucial variety. Among the cases reported as faucial or tonsillar diphtheria are included, as we have seen, many cases which formerly went on record as simple tonsillitis. That this accounts partly for the reduction in the mortality of diphtheria is evident, yet it does not make as great a difference as the increase in the number of cases reported would indicate.

In considering the advances made in the treatment of diphtheria in the last ten years, the relief of laryngeal stenosis through intubation should be accredited with part of the suc-

cess in the management of this disease. In many neglected cases not seen by the physician until the larynx is involved, and also in primary laryngeal cases, intubation often becomes necessary to relieve the stenosis and to avert impending death until the effect of the antitoxin can be obtained. O'Dwyer introduced this brilliant surgical procedure in 1885, but its employment did not become general for several years; in fact, the European physicians have only in the last few years been taking it up, and even now there is a preponderance of tracheotomy over intubation. After the value of intubation became recognized, the mortality in "membranous croup" was lowered from 90 to about 65 per cent. Since intubation has been supplemented by antitoxin, the death rate has been so lowered that the former per cent. of recoveries—10 to 15 per cent.—now almost represents the death rate. As a consequence, statistics no longer note the number of recoveries, as heretofore, but now record the percentage of deaths. A remedy with such results may almost be considered specific, and we cannot fail to see in it one of the greatest contributions to medical science and a triumph for bacteriological research. The antagonists of the serum therapy, of whom there were many, have diminished rapidly, until to-day it is practiced almost universally. In most of the health reports the mortality in the laryngeal cases is still over 20 per cent., St. Louis showing a mortality rate of 28.26 per cent. in 322 cases, and the last report of the American Pediatric Society 27.2 per cent. in 1704 cases. Private statistics of such reliable men as Rosenthal, of Philadelphia, Shurley, of Detroit, and others, show much better results, the former 13.1-3 per cent. of 100 cases, the latter 16.1 per cent. of over 100 cases.

In regard to the dosage, the American Pediatric Society, which investigated the subject of diphtheria and antitoxin treatment, recommends as follows: "All cases of laryngeal diphtheria, the patient being two years old or over, should receive: first dose, 2000 units at the earliest possible moment; second dose, 2000 units twelve to eighteen hours after the first dose if there is no improvement in the symptoms; third dose, 2000 units twenty-four hours after the second dose if there is no improvement in the symptoms. Patients under two years of age should receive 1000 to 1500 units, the doses to be repeated as above."

Very excellent results have also been reported from antitoxin as a preventive measure. Behring reported one hundred thousand cases in which the serum treatment was employed as a preventive in which only ten cases of diphtheria developed, although many of the children had been exposed to the infection. The New York State Board of health has on record one hundred and sixty thousand cases in which antitoxin was used as a prophylactic measure, among whom seventy-nine cases of

diphtheria developed, mostly of a mild type. This observation has led to the adoption of prophylactic injections as a precautionary measure in many hospitals and orphan asylums during the prevalence of epidemics of diphtheria.

Electric Light in Diseases of the Respiratory Organs. At a recent meeting of the American Laryngological, Rhinological, and Otological Society, Dr. W. Freudenthal (Annals of Otology, Rhinology, and Laryngology, August, 1902, gave the result of his experience with electric light in diseases of the respiratory organs.

At first he had hoped to affect the deeper tissues by the actual passage of bactericidal rays into them, but it was found that these just penetrate the epidermis and cutis. In studying the therapeutic effects of the electric light, one must distinguish between the incandescent and the arc light. The author said that he had been experimenting on this line as early as 1889. He had found the arc light preferable even for the larynx. He made use of the ordinary search light, in front of which the patient sits at a distance of six or eight feet. Most of the screens suggested for removing the heat were objectionable because they absorbed in large amount certain other important rays. He used the electric light in the treatment of both laryngeal and pulmonary tuberculosis, and although he had never cured an advanced case by this means the treatment was of value just as was the use of morphine, heroin, or hydrotherapy; indeed, the electric treatment stood on the same level as hydrotherapy, but was superior to the latter because it relieved pain and facilitated expectoration. Because of the neurotic element in cases of hay asthma, the results of the electric light treatment had been more conspicuous.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

Equipotential Surfaces in the X-Ray Field—Their Production and Utilization. By John T. Pitkin, M. D.

For a one-wheel static machine to produce a quantity of X-radiance equal to another machine having forty-six revolvers, it must be operated forty-six times as fast and sustain no additional loss of current through the atmosphere or upon the neutralizing system in consequence of incidentally increased voltage or tension.

The electrical loss in air can be estimated by the degree to which a glow lamp, held in the hand of the operator with its base toward the apparatus, is lighted, by the charging of a Ley-

den jar held in the same manner, or the precipitation of elementary carbon upon the exterior of the Crookes tube and other objects of the apartment with which it is immediately surrounded. The loss upon the neutralizing system can be seen by inspection of its collecting combs after the room has been darkened.

The greater the number of plates in the generator, the larger is the volume and the steadier and more penetrating the X-ray field. The lower the tension or voltage, the less the loss of current. The larger and softer the tube which can be operated, the more concentrated the cathode rays and the longer lived the tubes. Conversely as the vacuum in a tube rises beyond a given point, the capacity of the tube decreases, a smaller machine cannot fully excite it, the rays are penetrating but attenuated, the cathode rays become more eccentric, and the electrical loss is greatly augmented.

I prefer the static generators to the coils, because their discharge is continuous, direct, and uniform; there we work upon a primary, not a secondary, tertiary, or quaternary circuit. They are less affected with induction complications, do not break down from internal discharge, have no make and break to fail to operate, and cause less strain upon the tubes, through which their discharge is more concentric. They afford us an ever ready, never failing source of electrical supply.

It is one of the requirements for the generation of static electricity that a dielectric shall be interposed somewhere in the circuit in order to create and maintain a difference of potential. The dielectric so employed is usually the air space between the discharging rods or the rarefied air in the interior of the Crookes tube. If, within certain limits, the air spaces are increased in length or number, or the gas within the tube becomes more rare, while the generator maintains the same speed, then the volume and potential of the current will rise proportionately, causing the X-ray field to increase in volume and penetration. I am indebted to the writings of Nicola Tesla for my first knowledge that many small air gaps in simple series are superior to one long interval. He places several metallic buttons in a row between which the current is operated.

My improvement consists in a glass rod one foot long, about the size of your little finger. This rod is made to project like a semaphore, horizontally outward and obliquely forward from the arm of the positive prime conductor, between the great ball and the handle of the discharging rod. On the glass rod are slipped several plain band brass rings which are made so that they can be moved freely inward to close, or outward from each other to form intervening air gaps. When the brass rings are separated from each other and the current turned on, a beautiful cascade of sparks plays between them, nearly surrounding

the glass tube on all of its exposed sections, and the generation of X-rays is greatly intensified.

With this spark gap multiplex very low vacuum tubes can be operated and wonderful therapeutic effects obtained. But as the vacuum in the tube rises the number of intervening spaces should be decreased proportionately, and the resistance of the tube employed in its reciprocal relation. A series of spark gaps, to be most effectual, must provide a disruptive, not a connective, discharge between the various sections. The brass rings can be moved to and fro upon the glass rod with an insulated pointer held in the hand of the operator, or one of the electrodes supplied by all the makers of static machines can be employed for that purpose.

If hard rubber is used as a support for the brass rings instead of glass, as described above, it will be oxidized by the current and the discharge will become connective and irregular.

In order to prevent distortion of the image and obtain correct localization of foreign bodies the fluoroscopic screen and photographic material should be made to conform to the shape of these equipotential surfaces.

As the anatomical structures to be examined have by construction the desired shape, i. e., concave from side to side and convex from above downwards, why should not the X-ray pictures of the inside of the human body be as free from distortion as the delineations of its exterior by the expert photographer? *Am. X-Ray Journal*, December, 1902.

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Note on Vacuum Tube Discharges.—From vacuum tube discharges, whatever the source of current of high potential and high frequency, whether influence machine or high tension coil, there may be obtained not only the blue violet and ultra violet rays of light, but in tubes of sufficiently high vacuum, and in which the cathode stream proceeds in a straight line, the short, irregular vibration of the X-ray as well. Of the vacuum tube electrodes which I have in daily use, this phenomena is most marked in the aural tube, although manifest in the vaginal and rectal as well. The tube for intra-cervical application is constructed on the same lines as the aural, differing only in length. I have had it made to use in the treatment of malignant diseases of the cervix uteri, in addition to the X-ray.

The X-ray phenomena in these tubes I have demonstrated fluoroscopically. Nothing shows so conclusively the relationship of these different rates of vibration as this phenomena. The energy is slight as compared with the large tubes, but it is

used directly at the site of the disease, instead of at a distance from it.

The clinical evidence secured shows that the physiological effect of the ultra-violet rhythmic light differs only in degree from the ultra-violet jangle of the X-ray.

To secure the best results these tubes should be connected with the secondary circuit. The subject of vacuum tube discharges and their uses will be fully considered at an early date by the writer.

The literature of phototherapy is steadily increasing. In a little book by Dr. Antonio Sciascia, the value of light therapy is emphasized.* The work is largely devoted to a consideration of cases treated. A large range of pathology is covered, and the list includes facial erysipelas, chronic non-febrile periodical erysipelas (*eresipela cronica periodica afebbre*), malignant pustule (four cases), lupus vulgaris (two cases), tuberculous peritonitis, orrhymentitis, tubercular gummatous lymphangitis, tuberculous polyadenitis, chronic pulmonary tuberculosis, descending diphtheria croup, whooping cough (two cases), lobar pneumonia, typhoid fever, puerperal metritis, gastric ulceration with hyperchlorhydria, blemorrhagic arthritis, chorea minor, epilepsy, cataleptic hysteria, acquired deafmutism, hysterical dysphagia, tic douloureux, sciatica with exophthalmic goitre, and epithelioma (four cases). It might seem at first glance that the application of light to some of the pathologies indicated must have proceeded along empiric lines, as conditions are enumerated which do not suggest its rational use. However, as the ultimate effect of light is one of oxidation, with improvement in metabolic change and an increase of the natural processes of regeneration within the tissues; it is possible that the use of light in all the conditions enumerated is entirely rational.

Sciascia records four cases of malignant pustule, and states additionally that he has treated twenty-eight cases, more or less grave, since 1890, with invariable success. Brilliant results are claimed in sixteen cases of lupus, all told.

In the case of pulmonary tuberculosis the duration was only two months, and while the physical signs were not positive, the tuberculin test evoked a decided reaction.

The symptoms of the disease began to subside in forty days, and twenty more applications resulted in recovery. Seven years later the patient remained well.

Sciascia is of the opinion that the treatment would be of value in the pre-tuberculous stage, but that later it can only strengthen the natural forces, and diminish the tendency for the disease to spread.

In a case of orrhymentitis in a young woman, there was effusion into the pericardial, pleural, and peritoneal cavities.

* La fototerapia ~~Roma~~ Società Editrice Dante Alighieri, 1902.

The duration of the disease was forty days. She was anæmic, her nutrition impaired, and she had fever. Fifteen applications of condensed light over the thorax and abdomen, each lasting an hour and applied every other day, resulted in a complete cure.

In most of the conditions treated the author reports improvement or recovery.

Sciascia has his own light condenser, to which he has given the name of foto-cauterio.

It does not follow that similar results will always be obtained, but there can be no question as to the value of light therapy. Everything depends upon an intelligent appreciation of the pathology, the adjustment of the mechanism, and the skillful application of the light energies.

The editor of this department has followed two cases of pulmonary tuberculosis, treated respectively five and four and a half years since with the arc light. The characteristic physical signs were present in both cases, and the tubercle bacilli were present in the sputum. Both remain well.

Of interest in connection with Sciascia's experience with malignant pustule, a case of blood poisoning, due evidently to the bite of an insect on the middle of the dorsal surface of the foot, just over the arch, may be instanced.

There was systemic infection, as evidenced by chill and fever. The lymphatics from foot to groin were swollen, red, hot, and painful. There was intense localized inflammatory action at the site of the bite, with the characteristic boggy feel of a deep-seated suppurative action, and also an extensive cellulitis of the entire dorsum of the foot.

The patient was unwilling to have it laid open when I saw him at his home. I had him brought to the office, and under a single application of ultra-violet light, applied with a compressor and continued for fifteen minutes, the pain, swelling, soreness and disability disappeared almost entirely.

A subsequent application was made on the following day as a matter of precaution. There was no further trouble.

The tissues under the compressor remained analgesic and indurated for several days, but both of these conditions disappeared under the convective discharge of the franklinic current.

Phototherapeutics in Obstetrics in Gynecology.—It is believed by Curatulo that the dilatation of the capillaries, the direct stimulation of the cells, and the reflex excitement produced in the vaso-motor nerves by the application of light baths will certainly benefit some forms of pelvic diseases.

Curatulo has devised a speculum with which he tests the efficacy of light baths in diseases of women. By means of it the incandescent light is divided into its constituent parts.

The three kinds of rays, heat, light, and chemical, are isolated and applied separately, or united according to the case. It permits the simultaneous use of the liquid douche and the light bath, or the latter may replace the former and act as a hot air douche.

In cases of metritis, or hypertrophy of the cervix, he believes that an important modification of nutrition may be obtained by moderate application of the chemical rays. In imperfect development of the uterus and the cervix (a frequent cause of sterility), the ability of the chemical rays to improve nutrition should be useful. In peri-metritis and para-metritis, conditions which frequently cause uterine displacements, an application of the chemical rays tends to facilitate the absorption of exudations. In uterine inertia the vaginal light bath is useful by reason of its stimulating effect.

The author thinks the germicidal power of the chemical rays will be of value in specific ulcerations of the cervix and is making some clinical researches that will be given *in extenso* in a future note.—British Medical Journal, October 11, 1902.

Remark.—In the treatment of malignant diseases of the cervix uteri involving vaginal walls and adnexæ the editor has found the chemical rays of light to be of very great value as supplemental to the action of the X-ray. The lesser expenditure of energy of light rays can be utilized at times when the greater expenditure of energy of the X-ray would tend to produce too intense an action. The result in these cases indicates that the chemical rays of light should prove of very great value in many non-malignant pelvic conditions, as Curatulo has indicated.

The Present Status of Light Therapy.—Marcuse, summarizing our knowledge concerning the action of light, says that a clear distinction must be made between local and general effects of light. In 1859 Charcot demonstrated that sunburn was dependent upon the chemical rays of light; not upon the heat rays. That typical sunburn, first noted by Widmarks, is produced by electric light is now a matter of common knowledge. Heat rays produce an entirely different type of inflammation from that brought about by the action of violet and ultra-violet rays. Under the influence of light rays there is a dilatation of the blood vessels lasting a long time after the exposure as has been demonstrated by Finsen. Accompanying this vaso-dilatation Bang, the assistant of Finsen, has demonstrated a marked leucocytosis. Light seems to exercise an influence on every form of organic life, as well as to produce the local effects described. There is an increase of CO² given

off in the higher animals, while among the lower forms of life strong light has a fatal action. This is especially true of bacteria. Bacteria can be killed in from five to eight hours by an ordinary arc lamp, but by means of the concentration of the light activities Finsen has killed them in as many minutes. It is upon the combination of the germicidal and vaso-dilatory powers that the therapeutic effect of light depends. Its place in the treatment of lupus, as demonstrated by the treatment of Finsen, is unquestioned. It is also of great value in other skin diseases of a parasitic nature, as herpes tonsurans or favus. Marcuse most justly sounds a note of warning against many so-called light cures which are swindles and bring disrepute on valuable therapeutic measures.—Balneol, Centralzite, 1902. No. 22.

Electrical Amblyopia.—In discussing the effect of electricity on the eyes, Galezowski states that this is a lasting visual disturbance provoked by habitual exposure of the eyes to electric light indoors. He finds that the electric light can produce (1) Amblyopia without any material lesion of the ocular fundus; (2) photophobia following on lachrymation due to intense retinal excitation; (3) central scotoma; simulated amblyopia, which must be recognized to avoid falling into error. These latter cases are usually in operatives who seek to obtain an increased premium. Among the therapeutic measures recommended are the use of uranium spectacles and the application of cold compresses or ice bags to the eyes two or three times a day.

Treatment of Phthisis with Blue Light.—Kaiser, in treating a septic ulcer on his own hand, due to infection from a suppurating case, became convinced of the bactericidal action of pure blue light. By reason of the excellent result obtained, he was led to investigate the subject and obtained the following results: 1. Tubercle-bacilli in pure culture were all killed in thirty minutes by the blue light at a distance of five meters, while they survived the equal illumination by an ordinary arc lamp. 2. Tubercle-bacilli in pure culture were pasted on a patient's back and the blue light was directed to the patient's chest at a distance of five meters for thirty minutes. This was repeated for six days. The bacilli were weakened. 3. Pure culture of tubercle-bacilli were illuminated by the light concentrated through a hollow lens containing a solution of alum and methylene blue with ammonia. They were killed. 4. The same lens was used and the light was split up into the spectral colors by means of a carbon di-sulphide prism. Cultures lived in red and yellow light, but were killed in from blue-violet to ultra-violet. 5. A photographic negative with an unused film

was pasted on a patient's back in such a way that the light was excluded. The film was illuminated through the patient's body and a blurred "positive" was obtained. Subsequently Kaiser treated two cases of advanced phthisis; after six days night sweats ceased, and cough became less. After six weeks (which brings it up to the present time), diminution of bacilli in sputum. In the case of tuberculous abscesses in the thigh and knee flexion, which had been treated for three months without result, there was obtained healing of all the abscesses in four weeks from the application of blue light. In a child of tuberculous character with a weeping eczema, cure was established in five weeks. For these observations he draws the following conclusions: (1) blue light kills tubercle-bacilli; (2) the heat rays are excluded by the hollow lens with cooling arrangement; (3) action of light is dependent upon the distance and intensity of the source of light; (4) the light can pierce the body sufficiently strongly only the chemical rays do so; (5) pure blue light acts strongly as a resorbing agent; (6) blue light has a local sedative action if the rays are concentrated and may even produce anæsthesia.—British Medical Journal.

Remark.—In a single exposure to all the activities of the arc, the editor secured healing of every fissure and crack in a case of chronic eczema of the fingers and hands save on one thumb, and in psoriasis of many years' standing a cure was established after five applications. In a case of acute phthisis the bacilli disappeared in seventeen days and did not recur. The patient made a good convalescence and remains well—almost five years later.

Excellent Results in the Treatment of Diseases, Especially Tuberculosis, by the Use of the Ultra Violet Ray.—In a symposium on the treatment of tuberculosis, presented at the twenty-eighth annual meeting of the Mississippi Valley Medical Association, Dr. Albert E. Sterne discussed the above subject. For general applications the nude body was exposed to intense light, applied by powerful voltaic arcs, and, in addition, free ozone was developed from a special ozonating apparatus. For local applications vacuum tube electrodes, connected with one pole of a suitable apparatus, were used. He deduced the following conclusions from his observations: (1) actinic rays are chemical in their quality but of small caloric value; (2) they exist mainly in the ultra violet zone of the spectrum; (3) actinic rays derived from high power electric lights are identical to those of solar origin; (4) their use is as rational as sunlight itself; (5) their value lies in their decomposing but at the same time reconstructive molecular action upon the body tissues, mainly the blood elements; (6) their activity is

enhanced by the generation of ozone in free and nascent form; (7) their ultimate effect is one of oxidation, consequently they increase the metabolic changes, thereby augmenting the natural process of regeneration within the system; (8) their germicidal action is especially pronounced on account of the fact that germs cannot exist in the presence of free or nascent oxygen in either bianatomic or triatomic form.

DERMATOLOGY.

EDITED BY ALBERT C. GEYSER, M. D.

Mode of Action of the Physical Agents in the Field of Medical Electricity in the Treatment of Lupus. By M. Le-Redde. Archives d'Electricité Medicale.

For the treatment of lupus tuberculosis and lupus erythematosus the galvano-caustic method, high-frequency radiotherapy, and phototherapy are considered.

With Besnier and Hutchinson he admits that "erythematosus lupus is a tuberculosis of the skin, and should be classed in the group established by Darier under the name of tuberculides. He calls attention to the fact that complete ablation of the lupus in full, hypodermically, as in the practice of Professor Lang of Vienna, is followed forty-eight times out of one hundred by a relapse."

In the therapeutics of lupus one should never lose sight of the considerations of its structure and depth, one should not forget that he has to deal with a tuberculous lesion exceedingly rebellious to all applications of whatever nature. The number of cases of tuberculous lupus really incurable is not estimated by Finsen above two per cent. As concerns erythematosus lupus it is impossible to establish parallel statistics.

"In the majority of cases tuberculous and erythematosus lupus attacks the face; therefore, other things being equal, we should prefer the method which leaves the least definite trace of its action. Finally, we have to take account of the pain produced by the treatment, and it suffices to say that phototherapy and radiotherapy do not provoke any pain, that the high-frequency current does not produce any disagreeable sensations other than such as a patient can tolerate; while, on the contrary, galvano-cauterization provokes sharp pain.

Galvano-Caustic Method of Besnier.

The effects of this method are: Destruction of the bacteria, death of the tissues, followed by a gradual liquefaction

and evacuation of the necrosed regions. Repair takes place by cicatrization, deep and superficial. The general results of this method are not very good.

There are to-day in the treatment of erythematous lupus methods more certain from a curative point of view, and more satisfactory from the æsthetic view itself—the high-frequency in the superficial congestive forms, phototherapy in the fixed forms.

The writer observes, "With Finsen galvano-cauterization is not indicated in tuberculous lupus, as the treatment should be made at the onset by phototherapy." To this he dissents, observing that he has seen in the hands of his friend, M. Besnier, a large number of the lupus of Wilan cured by galvano-cauterization. He hopes that it will be used in the treatment of deeper types of lupus. In other cases the physician has the right to use galvano-cauterization, but after having used it for one or two months in a careful manner, he should let the patient rest a long enough time for the cicatrix to take its definite shape. Yet there are a certain number of cases in which it is not worth while to continue, because one is not certain to cure the patient, and, on the other hand, the lupus tissue is transformed into demi-sclerous tissue, rebellious to the action of the chemical rays, and the lupus becomes incurable.

The High-Frequency Currents of Tesla and D'Arsonval have been applied in the treatment of lupus vulgaris, and some favorable results have been published, but the amelioration was not marked and it is extremely doubtful if they have a curative value.

In erythematous lupus, on the contrary, high-frequency constitutes a remarkable therapeutic method, and it is destined to cause to disappear the most of the ancient processes in the treatment of the congestive forms. The work of Dr. Jacquot, aided by M. Broc, has demonstrated this quite clearly. It is established that of the superficial lupus of the aberrant type of Broc has cured by high-frequency a great majority of cases. It is not the same in the fixed lupus which in all probability the high-frequency cures only in some of the fixed forms which are purely erythematous.

The action of the high-frequency current upon the cutaneous vessels is considerable. It is not a simple immediate action, but perhaps a more diffuse action. From the congestion, the vascular dilatation which the application produces, there follows in a great number of erythematous processes a diminished congestion, a prolonged vaso-constriction. It is probable that here, as in phototherapy, the

physical conditions of the tissues play a considerable rôle, and that it is they which hasten the action in the deeper forms. Finsen's researches have shown us that certain causes limit the deep penetration of the chemical rays of the spectrum. It is desirable, therefore, that by the perfection of technique we can equally carry the *effluve* of high-frequency to a greater depth, and thereby reach the tissues which we do not actually traverse.

Radiotherapy.—We cannot judge yet exactly the mode of action of radiotherapy in the treatment of erythematous lupus and tuberculous lupus. By reason of the energy of the action of which it is capable, radiotherapy can have a great rôle in the treatment of lupus as in other grave deep lesions of the skin rebellious to less energetic chemical and physical methods. But it exacts a very precise regulation and an exact technique.

That radiotherapy can be a curative method we do not doubt. Schiff, Freund, and Kummel have demonstrated that it leaves excellent cicatrices.

It appears that the modification which the rays produce in the lupus tissues are due to their action upon the tissues, not upon the bacilli, and to reactions which are a consequence. In the lupus tissues subjected to radiotherapy a degeneration is observed of the cells, giant and epithelial, and a slow inflammatory reaction almost unique at the level of the diseased joints.

Phototherapy.—In erythematous lupus both Finsen and the author, from their researches, estimate about fifty per cent. of the cases cured. "The action of light upon the tissues in phototherapy is due to the chemical rays of the spectrum, of short-length waves comprised partly in the violet and ultra-violet. Among the chemical rays all do not have the same action or strength of penetration. Finsen declares that the penetrative action is greater for the chemical rays comprising the violet part of the spectrum than for the ultra-violet. A question of great importance and not well known is the absorption of the chemical rays by the blood, necessitating induction of anæmia by compression of the tissues to permit the penetration of the rays deeply."

That the chemical rays are *par excellence* bactericidal has been proven by exposing a culture tube to the sun's rays, when in a short time the bacteria are killed. If one places a red glass in the path of the rays to the tube the bactericidal action is *nil*. We utilize this bactericidal action of the light for destroying the tuberculous bacilli which cause the lupus. This action can be exerted deeply by compressing the blood stream during the application.

One knows that the reactions provoked in the tissues by chemical light rays are slow reactions, and do not appear

till the end of twenty-four hours, and one does not experience morphological alterations till the end of many days.

At the end of four days in cases treated there existed an erythema of a somber color; the skin appeared bare in certain spots, and bullæ appeared. Where no microscopic bullæ existed, one notices that the cellular nucleæ have disappeared, and in their place a hollow aspect was found; the protoplasm is colored in an abnormal manner; the granular layer has disappeared; and the horny layer is thickened.

Without observing completely the mechanism of the cure, our researches show, nevertheless, the importance of the effects produced by the chemical rays upon lupous tissues and the modifications it produces. The cure is without doubt due to the action of the chemical rays upon the Koch bacilli in the diseased tissues, but one cannot disregard the importance of the action of the rays upon the tissue as well.

A. D. M.

DIETETICS.

EDITED BY SIGISMUND COHN, M. D.

Practical Dietetics. By A. L. Benedict, A. L. M. D., Medical Standard, 1902.

Obesity.—The writer suggests a division into pinguidity or mere fatness, due mainly to excessive ingestion, and true obesity, depending mainly on a failure of oxidation.

Thus pinguidity is comparable to glycosuria, while the true obesity can be compared to diabetes mellitus. In diabetes the solubility of the unoxidized sugar leads to its conspicuous elimination in the urine; in obesity the unoxidized fat accumulates in the areolar tissues.

The dietetic treatment of pinguidity is simple and, granting that the patient co-operates, successful. Methods of rapid reduction are harmful and unnecessary. The best way to start the treatment is to let the patient make an accurate report of the ingesta for a week, counting crackers, biscuit, etc., as well as eggs (which do not vary much in weight), measuring milk; and weighing ordinary solids. This report should correspond as closely as possible to the ordinary habits of eating and drinking; then the physician changes this diet, eliminating gross errors. The reduction of proteids should not be made to less than about 100 grams.

The main reduction will be that of fat and he recommends to give the patient a daily ration of twenty to thirty grams instead of ninety, which is the normal. This reduction of fat

should correspond to a daily loss of weight of seventy to ninety grams, or up to about a pound and a half a week. Even the reduction of a pound per week is sufficient under ordinary circumstances, and the reduction signifying more than a substitution of tissue-fat for the deficit of fat in the diet should lead to an increase in the carbohydrate allowance, as it is unwise to diminish the available heat and energy of the body except slightly.

Coming to true obesity no sharp line can be drawn in practice between this and pinguity, but as true obesity is much more obstinate the physician will be able to make a diagnosis sometime afterwards.

It is easily understood that the treatment of pinguity and true obesity will be the same. At the beginning the patient shall be weighed in light clothing, and the weighing should be repeated at intervals of a week or two, with due precautions as to uniformity of clothing and accuracy of scales; allowance should be made for abnormally large or small bones, tumors, massive breasts, unusual muscular development, and for loss of weight by amputation. Dropsy and myxoedema shall certainly not be confused with fat.

Thyroid extract, phytolacca and other remedies proposed for the treatment of obesity have not given practical results in the writer's experience. Withholding water naturally leads to an immediate and quite rapid loss of weight, but we want to remove fat and not water, though some obese patients are in a state of general pulpiness of tissues. Entirely unjustifiable is the treatment of obesity by producing indigestion, impaired appetite, or nausea. Of course a reasonable control of appetite is necessary, and digestion should never be stimulated or assisted in an artificial way. The elimination of the waste products is an important factor in the economy of the body, but here also nothing can be gained by excessive stimulation of the bowels, the kidneys, or the skin; for instance daily Russian baths, cathartics, diuretics, etc., will rather reduce strength than fat.

Oxidation will certainly favor the combustion of fat. But introduction of oxygen into the body does not necessarily mean increased oxidation. The most useful means of oxidation are: ~~exercise~~ exercise, massage, and other physical therapeutic measures.

The author concludes by illustrating on a given case the principles laid down in his paper.

Treatment of Chronic Endocarditis.

In the American Medicine of May 24, 1902, Professor von Noorden, of Frankfort-on-the-Main, Germany, reviews his principles of the treatment of chronic endocarditis in the fol-

lowing manner: The cardiac muscle has to be built up in such a way that it is able to respond to any extra call made upon the organ. Only proper systematic exercise will accomplish this. Moderate exercise even for a long time is much better than violent exercise for a short time, indulgence in sports and games is therefore dangerous to the heart. The diet in heart disease is of utmost importance. Especially existing obesity has to be abated, but the reduction of fat has to be done very slowly. A mixed diet is preferable to either vegetarian or exclusive meat diet. Frequent and light meals are preferable to the customary three square meals. The quantity of liquids should be small. The restriction of liquids at meals lessens the weight of the patient, not, as has been supposed, by altering the metabolism of fat, but by lessening the appetite. The average quantity of liquids would be two and one half pints in twenty-four hours. Tea, coffee, and alcoholic beverages shall be avoided.

As one of the best exercises he regards slow hill-climbing. Bicycling is dangerous. Light gymnastics, if not overdone, are valuable; vibration massage, or other methods of massage he regards as decidedly beneficial, inasmuch as they stimulate the peripheral capillaries.

Hydrotherapy is sometimes useful, especially in the form of the carbonated brine baths, the natural being more beneficial than the artificial ones. They are contra-indicated in cases of lost compensation. For the last three years the author has used the electric baths after the system of Dr. Schnee. In these baths the four extremities are immersed in four separate porcelain tubs connected with a battery, the patient sitting in a comfortable chair. A switchboard leading to the battery permits the use of the different forms of the current as desired. The first few baths do not as a rule produce a great change, but gradually the reaction sets in, and the patient derives decided benefit from the treatment. The permanent effects of the electric baths are similar to those of the carbonated baths.

Nutritive Value of Oysters. Medical Review of Reviews, November 25, 1902.

The popular belief that the oyster is a most nutritious article of diet does not rest upon any scientific basis. The oyster as a food could not satisfy the demands of the human body.

While the oyster (when not stewed) is very palatable, wholesome, and easily assimilated by weak, impaired stomachs, it cannot be contended for a moment that it contains such elements of nutrition as may be found in beans, rice, or potatoes. There is very little if any fat-making, muscle-building material in the oyster. Its composition is largely nitrogenous, and

being rich in phosphates it is generally regarded as an excellent food for the brain, but a man reduced to the exclusive diet of oysters will soon find himself deficient in adipose tissue, and in those elements that go to make up physical force and vitality in the human body.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

Answer to Correspondents.

The Editor of this Department desires briefly to answer in these columns several inquiries recently received by him through the mails.

Dr. B very facetiously inquires what the diseases were "in the dogs" which he alleges I claimed in my article in last month's JOURNAL were cured psychically, without the use of words. If my facetious friend will refer to page 71 of the January number of the JOURNAL, he will observe that the words "*experiments on dogs and animals*" were used, and not the word *disease*. As a matter of fact, those experiments were conducted in conjunction with a professor in one of the leading Eastern universities, a gentleman of high scholarly attainments, for the purpose of determining whether animals could be affected psychically and without words of command. It was repeatedly demonstrated that the volition of the animal, as expressed by his movements, could be and was changed by a psychic command silently conveyed.

Dr F. H. asks what class of cases responds best to psychic suggestion. His answer will be found, substantially, in the remarks following the extract quoted from Professor Pershing's address. It may be added, however, that wherever there is an hysteric or even a mental element sufficiently strong to unfavorably influence the body, psychic treatment is indicated and is of incalculable service.

Dr. H. C. R asks if psychic treatment is recommended in cases where the pathology of the disease stamps it as hopelessly incurable? Probably not; but if all other means of cure have been abandoned as futile, what harm can result from trying it? The diagnosis may possibly be incorrect; and if not, there is no absolute certainty that the pathology of a disease is always infallibly correct. Conservatism is commendable when it does not intimidate our aspirations or discourage original investigation; but it has never given us our great surgeons nor our greatest physicians.

We need to have a care in making positive declarations about the "*incurability*" of a case because it fails to respond

favorably to certain approved lines of treatment. It is precisely that sort of error that has stimulated and made possible the growth of "Eddyism" and other similar fads. People pronounced by members of the medical profession as incurably ill and doomed to speedy death have, in repeated instances, embraced, as a last resort, so-called Christian science and recovered. Such recoveries are straightway heralded and exploited as establishing the truth of the absurd tenets of that faith. As a matter of fact, all that they did was to change the *mental or psychic attitude* that was preventing the successful operation of reparatory processes, and the patient consequently recovered. *Let me not be understood as asserting that recovery followed where structural changes had made it physically impossible.* What actually took place was the removal of the element that caused and maintained the simulation of irremediable organic change which the physician had overlooked. Few chronic diseases lack this element to some degree. Indeed, the very element of chronicity in disease tends very strongly to develop it. To simulate a given condition, if continued a sufficient length of time, will, in the end, actually establish it. For the purpose of removing the element upon which simulation depends, psychic suggestion, in some form or other, is the only effective means. The medical profession, *and it alone*, should be the channel through which this is administered. That it has not been so is manifestly its own fault, and it is idle to attempt to place the blame elsewhere.

For the benefit of *Dr. J.*, who is inclined to place a big interrogation point in front of all that is claimed for psychic treatment, let me quote from a gentleman who has never been accused of entertaining transcendental notions concerning the cure of disease. *Sir William R. Gowers, M. D.*, in his able and exhaustive work on Nervous Diseases, says (page 670): "It should be remembered that no part of the nervous system is unaffected by mental depression, and that general impairment through such cause may render impossible recovery from local disease. The only points that need special attention are, *first*, the importance of securing mental tranquillity by producing the conviction, when possible, that no grave disease exists or is impending; and, *second*, a disregard of the sensations of pain or discomfort that become more aggressive and disabling the more they are noticed."

M. F. P.

Every illness is a factor simple or complex, which is multiplied by a second factor, invariably complex—the individual who is suffering from it. The doctor who does not read you to the bottom is ignorant of essentials. To me the ideal doctor would be a man endowed with profound knowledge of life and of the soul, intuitively divining any suffering of whatever kind,

and restoring peace by his mere presence. Such a doctor is possible.—Amiel's Journal.

The following very interesting statement is abstracted from an address recently delivered before the Colorado State Medical Society, by Hamell T. Pershing, M. Sc., M. D., Professor of Nervous and Mental Diseases in the University of Denver, which was published in *American Medicine*.

An Illustrative Case.—Some years ago a young Russian Jew came to Denver from one of the hospitals in Philadelphia, armed with a big box of creosote pills, which were to aid him in a desperate fight to escape death from consumption. Less than a year before, while in apparently robust health, he had fallen into the water and was almost drowned. A violent cough began the same day and grew steadily worse, often being accompanied by vomiting. After a time blood appeared in the sputum and hemoptysis became first a frequent and then an almost constant symptom. Latterly blood had appeared in the urine also. His weight had fallen from 205 to 155 pounds.

He appeared at the Dispensary of the University of Denver, coughing incessantly and panting for breath, so that it seemed impossible for him to talk; his handkerchief was constantly held to his mouth and was covered with blood-stains. The students thought he might die at any moment.

But a thorough physical examination revealed nothing abnormal in the chest, so he was sent to me with the expectation that I would find a grave organic lesion of the central nervous system. I found right hemianæsthesia, amblyopia of the right eye, complete loss of hearing, smell, and taste on the right side, aphonia and some weakness of the right arm and leg, the whole combination being perfectly typical of hysteria. The history contained many points strongly indicative of an hysteric origin of all the symptoms. The blood on the handkerchief was genuine, but pale and thin, as though much diluted by saliva. The urine passed then was clear and contained no albumin.

The diagnosis of hysteria was made at the first interview and, in the presence of a number of students, a most impressive statement was made that the true nature of the disease had now been discovered and that he would be cured very quickly if he would only do exactly as he was told. His respiration was over sixty per minute, and the first thing was to drill him into breathing slowly. Then, after some electrical applications, made solely for psychic effect, he was sent to his lodging with the positive assurance that slow breathing would entirely stop the coughing and spitting of blood and that he would sleep soundly that night. To insure fulfillment of the latter prediction, he was given ten grains of chloral to take on going to bed. Other drugs were purposely omitted.

The patient slept that night and returned next day in an

exuberant state of happiness; the dyspnœa and cough were practically gone, there was no blood in the saliva and the voice was much stronger. St. Luke's Hospital admitted him as a charity patient, and on full feeding and continued encouragement he gained very rapidly in weight and strength. Some days after admission he insisted on going out to beg some money, and on returning unsuccessful was tearful and apparently greatly depressed. The next morning the house physician observed that there was blood in the sputum and also in the urine. This disappeared during the day, but was noted again the following morning. The specimen of urine furnished me each morning was of a clear crimson color, without sediment, contained albumin, responded to the guaiac test for blood and under the microscope showed many red blood cells. With the blood cells was a considerable number of squamous epithelial cells, which I supposed to be from the bladder. Only here and there was a columnar epithelial cell observed. Blood did not appear again in either urine or saliva and the patient made very rapid progress, about 25 pounds being gained in a few weeks.

He then left my care, saying he must return to his family in Philadelphia. For some reason, probably to get a little money from me, he was lying, and instead of leaving Denver, went to work in a livery stable. Some days later, while currying a horse, he sank to the ground and was found to be paralyzed on the right side. Speech was retained and he cried a great deal. Two weeks after this the physician who had examined his chest happened to find him in a lodging house and told me of his condition, remarking that whatever else might be hysteric, this hemiplegia was organic! Some students hunted the man up and brought him to my office. I found the right arm and leg in rigid extension, the foot was dragging, not swung; the face and tongue were not involved; right hemianæsthesia had returned; in short, the paralysis was clearly hysteric.

After some reproaches I promised to cure him again, at eleven o'clock the next day. The students saw to it that he kept his appointment and after some electrical stimulation of the affected muscles, followed by manipulations, he used both the leg and arm very well, but slight awkwardness remaining.

Physicians are ready enough to admit that physical processes cause profound mental changes. But that mental processes may cause profound physical change still excites doubt and sometimes derision when the proposition is submitted. Nevertheless, one proposition is as true as the other.

The blanched face, chattering teeth, shaking limbs, and weak, irregular heart of a person who is merely frightened; the nausea cold extremities, arrested digestion, prostration, and loss of weight in a previously healthy person who has merely

received bad news by telegram; the manifestation of muscular energy in response to an idea, which occurs in every voluntary action; all these are constantly recurring proofs which might be multiplied almost indefinitely.

Emotional disturbances cause a particularly energetic disturbance of the thoracic and abdominal viscera, whether these organs are thought about or not.

Then too, we are not always able at first to exclude the element of hysteria, which may complicate a case and simulate a disease which has no existence in fact. One case responds readily to treatment while another, apparently similar, defies the treatment that was successful in a previous case. When a case does not reasonably respond to appropriate treatment, particularly if there is a scientific basis for expecting success, it is the part of wisdom always to examine carefully for a mental or neural element that may be lying in ambush and defeating our efforts. Medicine alone will never cure this complication, but psychic suggestion, if intelligently used, rarely fails to do it.

THERAPEUTIC EXERCISES.

EDITED BY WATSON L. SAVAGE.

Physical Training in the Schools.

A recent number of the British Medical Journal contains a notice of a public sitting of the Royal Commission on Physical Training in Scotland. The appointment of such a commission shows abundant appreciation of the necessity and advantage of training of the body as a part of an educational scheme. Its investigation to discover the trend of opinion as to the best method of physical training seems rather unsatisfactory. Most diverse and narrow views of the subject were given by the witnesses appearing before the commission. Dr. Almond, Headmaster of Loretto, favored outdoor exercise, including rifle practice, rather than a uniform, cast-iron system of training. Mr. Roderick Ross, Chief Constable of Edinburgh, advocated organized games in the parks, while Major General Sir Ian Hamilton considered games inferior to the German military drill. The single note of agreement in the evidence given by educators, doctors, and public officers lay in the favor shown by all to extended physical education both for boys and for girls.

It would be discouraging to propose an addition to the present school curriculum, yet we believe this demand for physical training should be met. One of the witnesses before the commission, Miss Mary Anderson, Headmistress, made the happy suggestion that half an hour be taken from arithmetic for this purpose. There is certainly no doubt that time spent in teaching children valueless processes, such as cube

and square root, could be spent to better advantage in educating the body.

The first provision that should be made is for the fitting of teachers in a broad, scientific manner. Further, it cannot be expected to provide a fixed series of exercises for all schools as conditions vastly differ, not only in country schools and city schools, but also in the several grades in one locality. Wide latitude should therefore be given the trained teacher in employing and adapting the work to the existing conditions. To round out his work, the Commission might well demand the minimum amount of time that should be devoted to instruction and hygiene. The report of the Commission will be awaited with interest, in the hope that its recommendations will be such as to bring about the appointment of a similar commission in this country to consider this important question.

SOCIETY MEETING.

THE CLINICAL SOCIETY OF THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

Stated Meeting December 19, 1902. Robert Newman, M. D., Chairman.

A paper on

THE RATIONAL BASIS OF ELECTRICITY,

by Dr. G. Betton Massey, of Philadelphia.

Dr. Lucy Hall-Brown then presented new electrodes for administering the static brush-discharge. She said:

At the November meeting of this society, Dr. Snow read a most interesting paper on the subject of the static brush-discharge as given off from the end of a wooden electrode. In his paper he drew special attention to two things. He said he got a better discharge from the wooden electrode in summer than he did in winter, and second, that when giving a treatment he noticed the handle of the electrode got quite warm and as it became warm the spray increased in volume—he therefore found it advisable just before giving a treatment to warm the handle by artificial heat, as holding it over an open grate fire, and slightly dampening the ball at the end of the handle. The theory advanced, was, that the heat reduced the electrical resistance of the stick of wood.

Seeing the value of Dr. Snow's work in this direction, I began using the wooden electrode as suggested, and this has led me to try some modifications the results of which I bring, at the invitation of Dr. Snow, to your notice to-night. In the first place I did not think the blue spray as strong as it might have been, and I could not keep it uniform because, as the dampness left the wooden ball, the current decreased in volume.

If too wet the spray was like a bombardment of fine stinging sparks, and if too dry it dropped down to a mere static wind; as a consequence I found it impossible to keep the electrode in just the right condition to insure a steady and uniform blue spray.

My first experiment was to thoroughly wet the handle as well as the ball, wiping it off well with a dry towel. This reduced the electrical resistance of the wool, and as a consequence greatly increased the blue spray discharge. I next tried dampening and heating the electrode at the same time, and I did this by using hot instead of cold water—drying it off as before with a dry towel, but the heat did not seem to make any difference one way or the other. My next experiment was to try and hold or maintain a uniform degree of dampness in the handle of the electrode. I found by taking a slightly damp towel and wrapping it about the entire electrode, leaving a corner projecting beyond the ball, that I could get a full and uniform spray. The towel would remain in practically the same state of dampness the entire day, and so during the day gave uniform results.

I combined the idea into a more practical form (as I show here).

It consists of a piece of hard rubber tubing some twenty inches in length into which is drawn a strip of felt, previously dampened. The felt at one end is made to project a little beyond the tubing. Inclosed in this manner the moisture in the strip of felt is retained for some time, but it will, of course, gradually dry out, and that is an objection; as a substitute I have found asbestos to answer very well. I have here an electrode constructed of this material. The strip of damp felt is simply replaced by a strip of asbestos. This electrode I find very satisfactory. The spray is soft, full, and always uniform, and the pointed end enables it to be carried just where it is wanted.

Discussion.

Dr. W. B. Snow: I am very much interested in this demonstration, and believe that in certain cases this spray will prove very acceptable. You notice that that discharge is a steady, fine spray, producing a sensation of heat. When I began using the brush discharge with the wooden electrode, it was some time before I came to discriminate between the positive and the negative insulation in using it. What led me to adopt the negative insulation was the fact that a case of brachial neuritis under treatment was made very much worse when I used the positive insulation. I also noticed that when I did make the application from the positive pole of the machine there were manifest numerous light-colored discharges, looking green in the darkened room. After making this observa-

tion I experimented farther with the same patient, and found that whenever the discharge was used from the positive insulation it caused severe pain, and did not produce sedation, even though kept up for a long time; whereas, with the negative insulation sedation was promptly produced. I found that as soon as the wooden stick became carbonized, or after it became very warm, little streams would start out from the side of the stick, such as you have seen in the demonstration just made. I do not consider the discharge so valuable when this occurs, and stop it by dipping the ball of the electrode in water. I am referring to its use in the treatment of inflammatory conditions. I will now demonstrate the discharge from the wooden stick, both before and after wetting the end. After the end of the ball is wet, the discharge seems to break up as it does from a new wooden ball electrode. Such an electrode will never give off a fine spray discharge, but numerous jets, which produce on the patient a sensation as of hot sand thrown against the surface. I find that in the treatment of local inflammatory conditions the best results are obtained from the new electrode, or one in which the ball alone has been submerged in water before using. If the handle is not dry the discharge is apt to follow up to the operator's hand in the form of a spark. By heating the electrode in cold weather, just as good results are obtained as in the summer months without heating. It is certainly inconvenient, but it pays to take this trouble. The wooden stick sometimes becomes uncomfortably hot if held in the hand; it is, therefore, convenient to make use of a metallic socket, to which the ground chain is attached, and which may be moved to and fro on the handle.

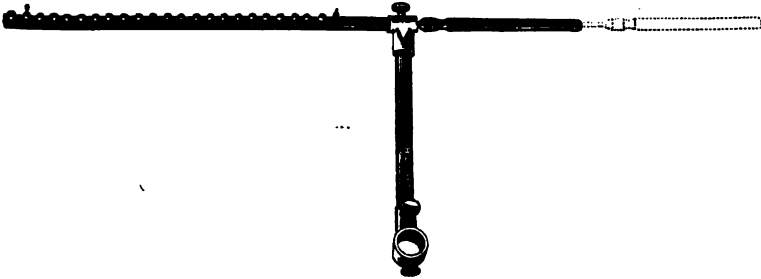
Dr. W. L. Heeve of Brooklyn: I have been treating indolent ulcers lately with the brush discharge. We have made use of a dowel rod of wood, and a piece of felt dipped in various solutions, but the results have not been satisfactory, and this has been discarded. Finsen claims that the vibrations are the essential part. In indolent ulcers we desire to obtain an anæmic surface, and we can only do this by compression. We are now trying to accomplish this by the use of an electrode made of several pieces of hard rubber tubing. This method is new, and we have not used it sufficiently long to speak with positiveness regarding it. So far, the effect on the healing of the indolent ulcers has been exceedingly good. What we want is a brush discharge which can be applied by means of a compression electrode which will not short-circuit. A case of psoriasis is now being treated by this same electrode.

Dr. H. Grad: The sensation produced by Dr. Lucy Hall-Brown's electrodes is entirely different from that produced by the electrode of soft maple. The sensation is more disagreeable at the time, and persists for a considerable time after

stopping the treatment. I cannot speak of the comparative efficacy of the electrodes therapeutically.

Dr. A. C. Geyser: Dr. Snow mentioned the fact that the value of the wooden electrode lay in heating the wood thoroughly through and through. I have two electrodes, and keep one under the hot water faucet while I am using the other. By this method they work very satisfactorily.

Dr. Herman Grad presented the Files Interrupter (Fig. 1), used for increasing the intensity of low vacuum tubes. It was shown that by means of a series of balls secured to a vulcanite



tube provided with a metal sliding rod, that it was possible to vary the series resistance according to the capacity of the machine or effect desired, and that by such interruption low vacuum tubes could be made to produce a radiance rich in the number of rays.

The particular advantages of the apparatus are that low vacuum tubes may be made to produce practical radiance for both therapeutic and skiagraphic purposes, thereby making it possible to lengthen the life of the x-ray tube, by making use of lower vacuum tubes than could otherwise be employed.

When it is possible to get a good radiance from low vacuum tubes, they are to be preferred for the above reason, and because for skiagraphic purposes it is possible to get better definition. It is for this reason that coils have been preferred by many for taking skiagraphs of structures which the rays from high tubes too easily penetrate. No originality was claimed for



the employment of series-ball and spark-gap interrupter, but the apparatus shown was simple and practical.

Dr. Grad also demonstrated the use of glass vacuum tubes, or modified Geissler tubes—three tubes were shown, one for use in the eustachian tube, and one each for the ear and rec-

tum. The two smaller ones (aural and post-nasal, Figs. 2 and 3) were provided with fine wires extending to the extremity of the tube, and the larger one made with a small tube which inclosed the wire and extended to near the end of the inclosing larger tube. These tubes are used either as other glass vacuum tubes, connected to the negative side of a static machine, the positive grounded, and regulated spark gap discharging, the patient not necessarily insulated; or by placing one small Leyden jar in connection with the positive side of the machine, the outer side of the jar connected with one extremity of the ball interrupter, to the other end of which is attached the cord of the vacuum tube. The spark-gap between the discharging rods is then opened and the interrupter regulated to patient and condition to be treated.

The future use of high frequency currents with vacuum and Geissler tubes is certain to be extensive, especially for use on the mucous surface within the cavities of the body.

At the next meeting of the Clinical Society, which will be held at 627 Lexington Avenue, on Friday evening, February 20, at 8.15, there will be a paper by Clarence E. Skinner, M. D., LL. D., on Dry, Super-Heated Air in the Treatment of Septic Infections, and a Demonstration of the Treatment of Malignant Diseases by the X-ray, and presentation of cases.

AMERICAN ROENTGEN RAY SOCIETY—Third Annual Meeting, held in Chicago, December 10 and 11, 1902.

The President, Dr. G. P. Girdwood, Montreal, Can., in the Chair.

X-Ray Physics.—Dr. T. Proctor Hall, Chicago, opened the program with a paper on the physics of the X-ray, which he concluded are electrical waves of some sort. He exhibited a new fluoroscope, which, in his estimation, is far superior to any other.

Equal Potential Surfaces in X-Ray Field.—Dr. John C. Pitkin, Buffalo, considered the principles and mechanics of static machines in general and exhibited an apparatus of his invention illustrating that many air gaps in simple series are superior to one long interval. This apparatus consists of a glass rod about one foot in length and one-half inch in diameter, on which are slipped a number of plain brass band rings, which are freely movable, to form the intervening air gaps. This apparatus greatly intensifies the X-rays. He suggested that in order to avoid distortion of the X-ray image the fluoroscopic screen and the photographic surface should be made to conform to the shape of these equipotential surfaces.

Presidential Address.—The president, Dr. Girdwood, in his annual address, reviewed the origin and development of electricity from the time of the early Greeks. He also consid-

ered the discovery of the Roentgen ray, the skiagram and the fluoroscope, and exhibited photographs made nearly thirty years ago, when the skiagram was still exceedingly crude. The apparatus in use at that time was described in full. The nature and origin of the X-ray was also discussed in full, as well as the value of the X-ray as a means of diagnosis and treatment. In closing, he called particular attention to the proper naming of these rays after their discoverer, Roentgen. All great discoveries in electricity had been named after the man who was instrumental in their discovery, and there is no reason why an exception should be made in this instance. They should be known as the Roentgen ray and not the X-ray.

Systematic Records and the Routine Use of the X-Rays.—Mr. W. J. Wilbert, Philadelphia, described the methods used in the hospital with which he is connected in the capacity of radiographer. He called special attention to the necessity and value of the routine use of the ray for diagnostic purposes, because in many instances a seemingly correct diagnosis is seen to be wrong when a skiagram is at hand for confirmation of the clinical diagnosis. This is especially true in unsuspected cases of fracture about or in joints which are usually classed as sprains or contusions or nerve injuries. Many cases were cited in support of this contention.

Skiagraphy as an Art.—Dr. J. Rudis-Jicinsky, Cedar Rapids, Iowa, read this paper and described what is absolutely necessary in order to procure a good skiagraph, the principal thing being expertness on the part of the radiographer. The expert finds things which are entirely invisible to the novice. The correct reading or interpretation of the shadows in a skiagram is by no means an easy task. He favors rapid exposures with a high current.

Results and Technic in Treating Epithelioma. [An abstract occurs also of the paper of Dr. Emil H. Grubbe, which will be published in full in the next issue of this journal.]

Discussion.

Dr. Clarence E. Skinner, New Haven, Conn., did not agree with Dr. Grubbe, that it was necessary to produce a dermatitis in order to get the best results from the use of the X-ray, although in the majority of the cases the production of some dermatitis hastens the cure.

This was also the opinion of several others who participated in the discussion. All favored a slight tanning or browning of the skin, but not actual burning.

Dr. E. J. Brown, Decatur, Ill., believes in producing a dermatitis, but finds that it is much easier to produce a burn and much harder to cure one on the body than on the face. He advocated giving the treatment in relays, as it hastens the

cure and also permits of a control of the degree of a burn. The X-ray gives a better functional result and cosmetic effect than surgery.

The Roentgen Ray as a Therapeutic Force, from a Clinical Standpoint, with Illustrative Cases.—Dr. J. B. Murphy, Chicago, said that in the fracture element of surgery the X-ray is of enormous benefit, although it is liable to err. It is also of great assistance in the diagnosis of tubercular affections of the joints in differentiating whether the lesion is one of the bone or of the synovial membranes, thus materially facilitating the method of treatment and the subsequent result. The X-ray is further valuable in these cases as a therapeutic agent, producing remarkably good results, and in an incredibly short time. He also cited a number of cases of tuberculosis of the spine in which the X-ray was used for its therapeutic effect. A cure resulted in each case, in one after twenty-five applications, in another after twenty-one. A third was very much improved after twenty-three applications. He called attention to the difficulty of correctly diagnosing the presence of renal calculi with the X-ray. It is often deceptive, showing stones when they are not there, and not showing them when they are there. Repeated skiagraphs should be made, and always in two directions. Deep-seated tumors, as of the intestinal tract, were not affected in his experience. In intestinal and tubercular fistulas the sinuses close up promptly after only a few applications of the ray.

Discussion.

Dr. J. P. Marsh, Troy, N. Y., called attention to frequent blood examination for prognosis. He finds that if the leucocytes increase in number the outcome will be a favorable one, and vice versa.

Dr. Clarence E. Skinner, New Haven, Conn., said that there is considerable difference in the way in which these growths respond to the influence of the X-ray. He suggested that perhaps it might be called an idiosyncrasy.

Others who discussed the subject were: Drs. Gibson, Birmingham, Ala.; Dunham, Cincinnati; Edwards, Nashville, Tenn., and Pennington, Chicago.

Dr. G. P. Girdwood, Montreal, Can., contributed a paper describing the treatment of cases of cancer, tuberculosis and rodent ulcer with the rays.

The Technique of Treatment of Malignant Growths.—Dr. J. N. Scott, Kansas City, Mo., read this paper. He insists that the apparatus used should be powerful enough to excite the largest tube to its fullest capacity and permit of a complete control of the current. He believes that the results of malignant growths are better when the cases are treated every day.

The ray should never be employed strong enough to produce a necrosis of the tissues. He begins with an exposure of four minutes and gradually increases to eight minutes when a reaction usually appears. The time of exposure is then diminished, followed by another gradual ascent until the period of reaction. This method is pursued until a satisfactory result is obtained. The growth should always be exposed from as many directions as possible.

The general condition of the patient should be carefully watched and all the functions, especially those of elimination, kept active. Dr. Scott is convinced that the Roentgen ray will cure a certain percentage of cases of malignant tumor, and improve nearly all, more or less. The X-ray is far superior to the knife in that the original tumor, as well as the metastatic growths, can be treated at the same time, thus preventing any further spread. It is also applicable where the knife is not. A special apparatus is described, devised by the author, for the purpose of preventing the possibility of producing a burn on other parts of the body, and also to protect the hands and eyes of the operator, which is a very important matter. The apparatus consists of a metal box which is perforated by openings through which the rays pass and through which the operator can also regulate his apparatus without exposing either himself or his patient. Since he has used this box he has no trouble whatever with burns of unaffected parts of the body.

Discussion.

Dr. Gordon C. Burdick, Chicago, does not believe that the normal tissue should be protected in a case of carcinoma, except when the tumor involves any part of the face. In body tumors the tumor tissue will break down long before the healthy tissue.

Dr. Lester E. Custer, Dayton, Ohio, exhibited a screen of his invention, containing a central opening adjustable in size by a series of diaphragms. It is mounted like a music stand and is freely movable in every direction for use on any part of the body to protect the healthy tissue. It also protects the operator. The screen is made of block tin, but any kind of metal can be used. It may be packed in a small space and is easily and rapidly set up.

Election of Officers.—The following officers were elected for the ensuing year: President, Dr. Arthur Goodspeed, Philadelphia; vice-presidents, Drs. John B. Murphy, Chicago, and Wm. Jordan Taylor, Cincinnati, Ohio; secretary, Dr. J. B. Bullitt, Louisville, Ky.; treasurer, Dr. Weston A. Price, Cleveland, Ohio; member of the executive committee, Dr. Ralph R. Campbell, Chicago. The next place of meeting will be determined by the executive committee.—*Journal Am. Med. Assn.*

BOOK REVIEWS.

THE CURRENTS OF HIGH FREQUENCY: PHYSICAL PROPERTIES, PHYSIOLOGICAL ACTIONS, AND THERAPEUTICS. By J. DENOYÉS, M. D., Electro-Therapist and Radiographer in the Hospital Montpellier. Published by J. B. Baillière & Sons, Rue Hautefeuille, 19 près le boulevard Saint Germain, Paris.

This volume of 374 pages, with numerous illustrations, is divided into three parts.

The first part is devoted to a detailed explanation of high frequency currents, the origin of research which led to their discovery and use, their physical properties, the apparatuses which admit of their production, and the technique of their application in therapeutics.

The second part is devoted to the physiological properties of the high frequency currents which justify their introduction in electro-therapeutics; their action on the nervous system; on the functions of nutrition (circulation, respiration, heat production, urinary secretion, and on micro-organisms.

The third part is devoted to the therapeutical use of the high frequency currents and the different modes of application: (1) the direct application, (2) auto-conduction, (3) application through condensation, (4) local application.

A technical consideration of the various methods is given, which indicates great familiarity with the subject treated. A number of electrodes are described and illustrated, as constructed for, and employed by French electro-therapists; they are mostly of metal with glass screens.

The different diseases in which the high frequency electrodes apply are then considered. The author considers the diseases of the heart and hysteria the only conditions in which high frequency is contra-indicated. He pays high tribute to the pioneers in the field of high frequency currents.

It is to Professor d'Arsonval, of the French Institute, however, "that we owe the knowledge of their physiological properties and therapeutical use."

The work is a typical consideration of the subject from the French point of view, and furnishes a valuable addition to the literature of the subject.

A. R. K.

REGIONAL MINOR SURGERY. By GEORGE GRAY VAN SCHAICK, M. D., Attending Surgeon French Hospital, N. Y., etc. etc. Bound in cloth. Heavy book paper, 226 pages. Profusely illustrated. Price \$1.50. International Journal of Surgery Co., N. Y.

This little volume is published to aid in the treatment of those conditions daily encountered by the general practitioner. The volume is up-to-date in everything, except in speaking of fractures the author does not mention the use of the X-ray

as an aid to diagnosis. As the author well says, "Minor surgery is minor in name only, since the most trivial injury may be followed by disastrous results. Slight injuries properly attended to are as important to the welfare of the patient as anything else that the general practitioner may be called on to do." This little book is full of good suggestions, and is freely recommended to the general practitioner. H. G.

THE COMPOSITE MAN. As Comprehended in Fourteen Anatomical Impersonations by E. H. PRATT, A. M., M. D., LL.D. Published by the New Age Publishing House, 100 State Street, Chicago. 233 pages, illustrated.

The popularity of this work is attested by the fact that this, the third edition, has appeared.

The author has placed in a pleasing and attractive manner, which an educated layman will appreciate, the knowledge of the human frame which should be universally understood. The dissemination of such knowledge would lead to the overthrow of quackery and cause the careless in the medical profession to be more guarded in expressing their opinions, and the methods they would adopt. He states his object to be, "First, to render the study of anatomy sufficiently simple and novel to be attractive, in hopes that it may be popularized; second, to secure recognition, on the part of those who have heretofore been inclined to overlook them, of the existence of man's spiritual parts as essential elements in all that concerns his every possible condition; third, to unify the conceptions of the various parts, which are usually prone to suffer a too isolated consideration.

The work deserves a large circulation, and contains much that will interest the medical man, and prove of great value to the layman.

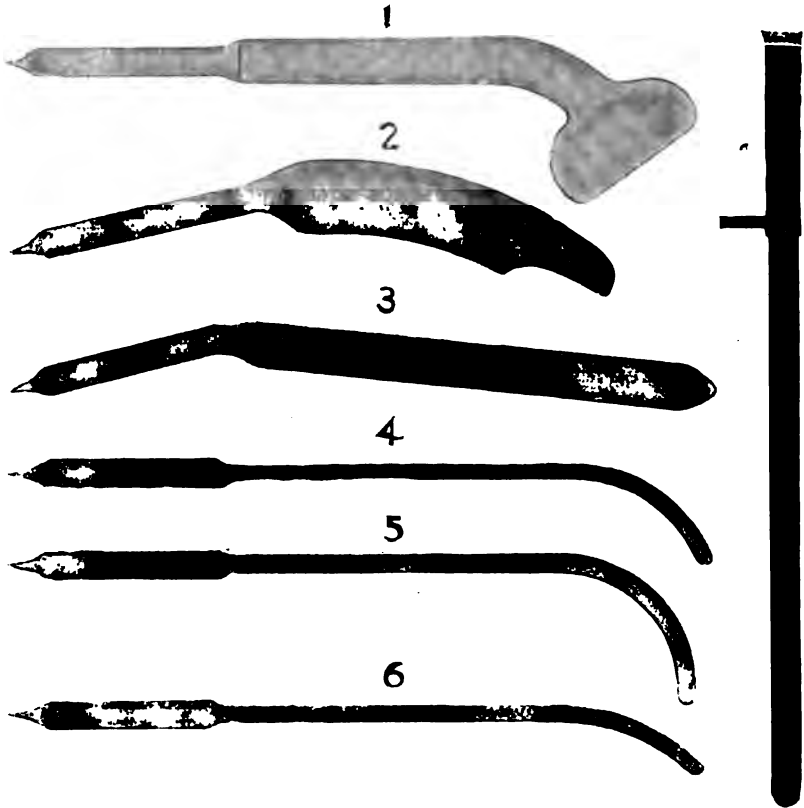
NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

A set of glass vacuum high-frequency electrodes, one-third actual size. Fig. 1, electrode for making applications to the surface of the body. Fig. 2, vaginal electrode, having a concave depression for the cervix. Fig. 3, rectal electrode. Fig. 4, urethral electrode. Fig. 5, electrode for making application to fauces and larynx. Fig. 6, flat electrode for application to nasal and post-nasal region. A handle is shown at the right for holding the various tubes.

The method of using these electrodes with the coil is to

connect to negative side of the apparatus and gradually turn on the current, consulting the comfort of the patient; time, ten minutes. For employment with the static machine, connect the electrode with the negative pole, ground the positive; close the spark-gap to within one-half inch, start the machine



and gradually open the spark-gap, consulting the comfort of the patient. Patient not necessarily insulated. Time, ten minutes.

The set is manufactured by E. Machlett & Sons, 143 to 147 East Twenty-third street, New York City, and sold for \$5.00 net.

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No. 3.

ELECTROLYSIS AND ITS THERAPEUTICAL APPLICATION.*

BY ROBERT NEWMAN, M. D.

Professor of Electrotherapy in Genito-urinary Diseases in the New York School of Physical Therapeutics; Chairman Executive Council and Ex-President of the American Electro-Therapeutic Association; Member American Medical Association, New York State and County Medical Associations, New York Pathological Society, etc.

Electrolysis is the decomposition of a compound body by electricity—a chemical decomposition—or the separation of a chemical compound into its constituent parts or elements by the galvanic current. The body to be decomposed must possess certain elements to be an electrolyte, and as a compound body must contain water and a salt. The electrode connected with the positive pole of the battery is the anode, and that attached to the negative pole is the cathode. The molecules of the electrolyte split up into elements or radicals, and are called ions; those which appear at the positive pole are called anions, and those which appear at the cathode are called cations.

Laws of Electrolysis.—(1) Electrolysis cannot take place unless the electrolyte is a conductor (electrolytic). (2) The energy of the electrolytic action of the current is the same, whenever exercised, in different parts of the circuit. (3) The same quantity of electricity—that is, the same current for the same period—decomposes chemically equivalent quantities of the bodies it decomposes, or the weights of elements separated in electrolytes by the same quantity of electricity (in coulombs or some equivalent unit) are to each other as their chemical equivalent. (4) The quantity of a body decomposed in a given time is proportional to the strength of the

* Read at the regular meeting of the Clinical Society, January 16, 1903, with experiment with Electrolysis.

current. (5) A definite and fixed electro-motive force is required for the decomposition of each compound, greater for some and less for others—without sufficient electro-motive force expended on the molecule no decomposition will take place.

Nicholson and Carlisle discovered this process of electrical decomposition in the year 1800, and electrolyzed water into oxygen and hydrogen; therefore, the theory is not new, and can be found in any text-book on elementary physics and chemistry.

This electrolytic action is an established fact, which everybody knows who has had a technical education. The practical electrician knows too well that the passing current of a trolley car destroys the metals of gas and water pipes by electrolysis. In several meetings of the N. Y. Electrical Society discussion on this subject has been held. Therefore it is incredible that many in the medical profession deny the action of electrolysis and some even deny its existence. An experiment made at a meeting of the N. Y. Academy of Medicine* is a striking illustration, in which the experiment was made with a sandwich and a dry piece of aorta from a dead calf, and of course no electrolysis followed from the current on dry surfaces. So many physicians have proven the success of electrolysis by absorption in diseases and reports have been made in great numbers. The late Dr. Rohé among many others wrote an article as follows:† “Those who hope to widen a strictured urethra by a cutting operation with a view of inducing nature to insert a strip of cicatricial tissue between the borders of the incision, have such a childlike notion of pathological anatomy that no time need be wasted in paying attention to their opinions. All surgeons who study pathology practically, and not transcendently, will agree that the only possible way to cure a stricture is to cause absorption of the submucous inflammatory deposit. No method promises to accomplish this so safely, promptly, and thoroughly as electrolysis.”

We have in the literature on this subject an abundance of

* *Journal of Cutaneous and Genito-Urinary Diseases*, July and August, 1888.

† “The Electrolytic Decomposition of Organic Tissues,” by Geo. H. Rohé, M. D., *New York Medical Journal*, December 1, 1888.

similar sentiments, and still more reports of the practical success of electrolysis in a great variety of diseases by reliable parties, and such reports have been investigated by scientific committees and many are verified by documentary evidence.

The action of the poles is very different in electrolysis; hence, each has its own function. The positive pole attracts the acids and the oxygen from the tissues, and coagulates blood. The negative pole attracts the alkalies and hydrogen and coagulates albumen and causes absorption. Hence, the positive pole acts and burns like an acid, which is not only exceedingly painful, but may leave a hard, resilient cicatrix. On the other hand, the negative pole acts more like a caustic alkali, which does not hurt during the application, and leaves, if carried to excess, a cicatrix that is soft and retractile. From this, it is evident that for the immediate destruction of tumors and for strictures the negative pole should be selected. Electrolysis requires the presence of water, and that you will find in every tissue of the human system.

As it is most important to distinguish the poles, and as we cannot trust to the marks of the instrument-maker, we must always ascertain which is the positive, and which the negative pole.

Experiments to show the different action of the poles and that electrolysis exists and acts, we will demonstrate now.

The Meat Test.—The poles of the battery in the shape of two needles (platinum are best) are inserted in a piece of raw fresh meat. After the electrolytic action has been allowed to take place for a while, the difference in pole-action can readily be observed. Even the application of five seconds shows an effect. Five milliamperes of current shows different decompositions in five, ten, and twenty minutes. The positive pole has made the meat black around it—almost charred and destroyed it—while at the negative pole the color is different, being nearly white, and bubbles of the hydrogen also appear like a white froth. While electrolysis is in active operation a hissing sound is heard at the negative pole, and the positive is noiseless, blackens the meat, and litmus paper applied to it shows, by its red color, an acid reaction.

Another phenomenon is the tenacity of the positive needle to the piece of meat. The needle at this pole is firmly adherent to the meat and can be removed only by rising force,

tearing away some of the production of electrolysis. This is a very important observation when operating, as the closed blood-vessels will be reopened again by a forcible removal of the needle. The needle, or electrode, at the negative pole is so loose that it will drop out by gravity, which is another proof of the absorbent action at the negative pole.

A piece of fresh meat still contains water enough to be an electrolyte, while the living body in which the circulation is active is better. A dried-up piece of meat is no electrolyte.

Decomposition of a Salt.—If, for instance, a solution of iodide of potassium be subjected to electrolysis, one equivalent of hydrate of potassium will be liberated at the negative pole, showing that the potassium liberated from combination with the iodine has combined with some of the surrounding water. This can be illustrated by simply holding both poles in the solution while the galvanic battery is in action, or better in a U-shaped vessel.

This experiment, however, is more strikingly demonstrative and original when made in the following manner: Two small glass vials are filled with a solution of iodide of potassium. The bottoms of the vials are substituted by pieces of a pig's bladder, the necks are then stopped by corks, through which platinum wires run, one end of each being immersed in the solution, and the other attached to a pole of the galvanic battery. Both vials so closed are placed in a dish of water; they are six inches distant from each other. There is no communication between them except the water, and as long as the battery is at zero, no change takes place in the solution, which is transparent and undisturbed. A change, however, takes place as soon as the battery begins to act. Only six cells are in circuit, and almost immediately in the vial connected with the positive pole streaks of yellow appear, and in about five minutes the vial contains only a dark, yellow fluid, which is the iodine set free at this pole. At the negative pole the contents of the vial remains clear, only bubbles of froth welling up. This is the hydrogen set free from the water. The result of this electrolysis is iodine, oxygen, and hydriodic acid at the positive pole, while at the negative pole we find hydrogen and potassium.

If this same experiment is tried with a faradic battery, no change whatever takes place in the solution. This is another

proof that the action of the galvanic current is widely different from that of the faradic and that for electrolysis a galvanic current only can be used.

Our next experiment is to show the effects of electrolysis upon the substance of a hard-boiled egg. The shell and the yolk have been removed, leaving the hard, firm, white albumen which has no fluid apparently, but the albumen has a moisture supplying the necessary fluid. We insert copper needles through the white albumen on a parallel line, connecting the other ends of the cords to the two poles of the battery, which is put in operation. In a few minutes we perceive the result of the electrolytic action, and see the disintegration of the copper needle at the positive pole and the nascent oxychloride of copper is evolved, producing a beautiful green tint, showing clearly the electrolytic action.

Any compound body or salt-solution can be similarly electrolyzed or decomposed, which may be illustrated as follows: In a solution of sulphate of copper the positive pole will attract sulphuric acid and oxygen; the negative copper and hydrogen. In a chloride-of-sodium solution, chlorine will go to the positive, and sodium to the negative pole, etc.

The next important question that arises, and which is a valuable factor for successful treatment, is, What is the best material to be used on the negative pole. We should select hard metals, those that stand in no danger of being decomposed or easily oxidized; hence, platinum, gold, and silver are best, but lead, tin, or brass do well.

The specific action produced by electrolysis in the treatment of stricture has received different names. This diversified nomenclature has produced considerable misunderstanding, and time has done little to remove the confusion and obscurity in which the action of electrolysis is still involved. Dutrieux calls it electrochemical cauterization. Dittel names it a chemical galvanocaustic. It seems that all who have written and experimented on the subject mean the same thing, but express it differently. This diversity in the nomenclature has provoked the criticism of the editor of that special department in Virchow's "Jahresbericht." Dutrieux, he says, depends for the action of the electrolysis on the caustic effects of the negative pole, which leaves a soft and less retractile

cicatrix, and wonders that Newman relies on chemical absorption as an effect of the electrolytic action.

That the same thing is meant is evident from the previous statement, as well as from the description of the *modus operandi* by Mallez and Tripier, who lay great stress, and rely on the chemical and not on the caustic effect that would result from the application of the positive pole or the approximation of the two poles. With such a definition, which is taken from Mallez and Tripier, why the French surgeons call the action "par la galvano-caustique chimique" cannot be understood.

The uses of electrolysis are manifold and many have been described by my late friend W. E. Steavenson, M. D. (Cantab.) in his book published by Churchill in London in 1890.—Apostoli's work will also kindly be remembered.

The list comprises: Aneurism—*nævi*, bedsores, carcinoma, diseases of the prostate, exophthalmic goitre, goitre, gleet, granular lids, hydatids, hydrocele, removal of superfluous hair, wounds and ulcers, urinary organs, port-wine marks, angioma, naso-pharyngeal disorders, fistulæ, fungoid growths, ingrown eyelashes, keloid scars, moles, hemorrhoids, strictures of the urethra, rectum, esophagus, eustachian tubes, lachrymal canal, vesical calculus, varicocele, varicose veins, tumors, ranula, blemishes of the face, particularly in females.

In gynecology we find reports from reliable sources of successful operations as follows:

Uterus.—Abrasion of the os uteri, stenosis general and special, endometritis, cervical catarrh, menorrhagia, metrorrhagia, flexions, subinvolution, hyperplasia, fibroid neoplasm, prolapsus, polypi, carcinoma.

Tumors.—Fibroid, ovarian, benign, and malignant.

Appendages.—Oophoritis, cysts, salpingitis, pyosalpinx, and hemato-salpinx.

Pelvis.—Adhesions, cellulitis, pelvic hæmatoma, hæmatocele.

Urethra.—Stricture.

Bladder.—Papilloma, tumors.

Rectum.—Stricture, etc.

Vulva.—Growths, cysts, extra-uterine pregnancy, etc.

This list has been made from the Bibliography on the sub-

ject, even if some gynecologists at present prefer to do operations, laparotomies, etc., for various reasons.

Formerly I succeeded well with fibroids of the uterus by using a platinum sound as the negative pole into the tumor approaching it by way of the uterine cavity. This may not have removed the tumor, but it absorbed the pathological tissue, reduced the size of the tumor, made it dormant, and the patient was thereby so much benefited that the result was just as good as a removal. This method has not been abandoned by myself, but at the present time I add or alternate with two new measures, the local application of the static wave current, and the use of the Roentgen rays.

Some cases may indicate other measures than electrolysis, and to be preferred, but Dr. Davis of Birmingham, Ala., makes a good suggestion, in saying: "Certainly Apostoli's treatment should be tried before resorting to hysterectomy."

Some abdominal operators of great reputation have declared a preference for electrolysis over the knife, among them Sir Spencer Wells and Thomas Keith. Among the mass of reports and papers we may mention the article on Electricity in Gynecology based on an experience of over one thousand applications by H. H. Hahn, A. B., M. D., of Youngstown, O., who closes as follows: "We demand that each factor shall carry its own proper share of responsibility. We demand that you do not shoulder upon the method, responsibilities which belong to an individual operator." Some drawings here made to illustrate the diagnosis and treatment of ailments in cavities will illustrate the valuable and necessary assistance of electric illumination.

(Exhibition of several instruments, constructed by the writer of the paper.)

The electrolysis should be applied with weak currents in order to absorb, and never to hurt, burn or cauterize or destroy tissues. If indicated, an exception to this rule may be made for good reasons. Séances must be made at intervals.

My method not to hurt, burn, etc., has not been comprehended by some members of the medical profession. I have practiced electrolysis now for 35 years, with success, in many thousand cases—have published many papers, have for most cases documentary evidence, and the statistics have been investigated and found correct by a committee of eminent surgeons, one of which has been published on page 40 of the Transactions of the American Electro-Therapeutic Association for 1893.

The object this evening was not to detail separate diseases or cases, but only to demonstrate the existence, power and action of electrolysis.

101 West Eightieth Street.

THE DIFFUSION OF IODINE BY THE ELECTRIC CURRENT.*

BY M. F. WHEATLAND, M. D., NEWPORT, R. I.

Member of Newport Medical Society, Rhode Island Medical Society, American Medical Association, American Electro-Therapeutic Association, American Association for the Advancement of Science, American Anthropological Society.

It is not the idea of offering anything strikingly original that prompts me in presenting this paper, but rather the desire that your thoughts be directed to this problem in electro-therapeutics which is necessary for its proper elucidation and a correct understanding among the members of the profession.

That there is a divided opinion in the profession as to the pole to be used in the diffusion of iodine by the electric current is evidenced by the following expressions quoted from various sources. In the Transactions of this Society for 1896, page 155 (part of the discussion of a paper by Dr. Shavoir), Dr. Massey said an excellent way of employing iodine was by the application of iodide of potash to the negative pole; judging from the condition of the cotton after such applications he believed that the potash collected on the cotton, and that the iodine had been driven into the tissues by the electric current.

Dr. Stephen H. Weeks said that he had been in the habit of using the iodide of potash solution on the positive pole for cataphoresis; a cylindrical electrode wrapped with cotton was soaked with a solution of iodide of potash and connected with the positive pole while the negative was a clay abdominal pad.

Dr Massey said he supposed that under the circumstances just mentioned all the free iodine would be on the electrode or in its immediate neighborhood, a portion of the iodide of potash salt would be driven into the circulation, and if the application was kept up for a sufficient length of time, the potash would appear at the other pole.

Dr. R. J. Nunn said that the great absorbent powers of the vaginal walls had been overlooked, he had known the patient to taste the iodine one minute after the application of iodine to

* Read at the Twelfth Annual Meeting of the American Electro-Therapeutic Association at the Kaaterskill Hotel, Catskill Mountains, Greene County, N. Y., September 3, 1902.

the vaginal wall, and that, too, without the patient having any idea that it was being done. This point should be remembered in connection with this discussion of cataphoresis.

Professor Cooper said that if the experiment were performed in a test tube, he would suppose that the iodine would be attracted by the positive and repelled by the negative pole, while the potash would be attracted by the negative and repelled by the positive pole; for these reasons he would expect the potash to accumulate at the negative pole.

Dr. M. S. Watson said he had made frequent use of iodine in the vagina in connection with electrical treatment. If iodine were applied to the positive pole the tissues would be always colored for a considerable distance from the pole. At the same time, if a solution of iodide of potash were used, the potash principally would accumulate on the negative pole, the iodine being set free.

On page 365 of the "Treatment of Diseases by Electric Currents," by S. H. Monell, we find the following method for the use of iodine: "Moisten a felt-covered, flat electrode, about 6 x 9, in the usual hot-water solution of bicarbonate of soda, connect it with the negative galvanic pole and apply it either upon the lower abdomen or under the sacrum. Wrap a light layer of absorbent cotton around the spiral electrode made especially for this purpose, connect it with the positive pole, dip the cotton in the iodide solution and insert it as desired."

Dr. Peterson in "International System of Electro-Therapeutics" (page 345), thus expresses himself: "For such cutaneous disorders as are commonly treated by painting with iodine, the use of some of the iodide preparations such as potassium, sodium, or lithium iodide, iodo or dilute tincture of iodine upon the anode is indicated."

Such, gentlemen, is our state of mind as to the use of one of the most important remedies in the pharmacopeia; certainly it is the one most frequently used in connection with pelvic inflammation, not much unanimity exhibited, neither does it evidence any systematic work done to demonstrate the correctness of one method or the other. It was in the endeavor to fill this gap and arouse your attention that I performed the following experiments. I began by using beef, but, as it was difficult to get the reaction to starch when I had reason to believe that the tissues around the electrode contained iodine

pelled by the negative pole and in the second attracted by the positive.

Since doing this work I have been fortunate in securing the "Outlines of Electro-Chemistry" by H. C. Jones of Johns Hopkins, and after a careful perusal of the same, it is safe to say that there is no reason for the belief that iodine can be projected into the tissues by the positive pole. In his experiments with chlorine compounds to determine the speed of migration of the ions, he makes no mention of its being an exception to the general law, and we have no reason to believe that iodine is such, when we consider that both elements are negative and on account of their close physical relation are classed together in the Halogen group.

If the conclusion that elements move from one pole to another according to their electrical quality be correct, then the assumption that one pole is a diffusible pole, regardless of the element to be diffused, is a fallacy. I say this because there seems to be a general impression that the positive pole is the diffusible pole under all circumstances. I presume this impression gained ground because of the common use of the metals, silver, gold, mercury, zinc, and copper, which are positive elements (cations) and necessarily move to the negative pole when connected positively and subjected to the action of the continuous current.

Had we started out to use the elements at the negative end of the electro-chemical series, we no doubt would have the negative pole designated the diffusible one.

Owing to the slowness with which iodine is diffused from an iodide, when it is desired to obtain the action of this element on the tissues, it seems more expedient to use a solution containing free iodine—such as Lugol's—one in which there will be a large quantity of the element to be acted upon by the current: a fifty per cent. Lugol's sol. answers well. When we consider that iodine is indicated in the conditions which suggest the use of the negative pole, a great advantage must come to those who in such cases properly combine the two remedies, electricity and iodine.

DISCUSSION.

Dr. Robert Newman said that the statements made in this paper and the experiments were correct, but he could not

accept the conclusions therefrom. The galvanic current had seven different actions, one of which was a chemical action, *i. e.*, electrolysis and cataphoresis. The latter he considered to be one part of electrolysis. By electrolysis was meant the decomposition of a compound body into its elements, and through the action of electricity. In the electrolysis of iodide of potassium the positive pole would attract the iodine, the oxygen, and the acids, while the negative pole would attract the base, the alkalies, and the hydrogen. Therefore, on the negative pole there would be a white color, and on the other pole the yellow color indicating the presence of iodine. Dr. Peterson had directed particular attention to cataphoresis, and had made the statement that the medicines could be transmitted from the positive pole to the negative pole. Dr. Newman here quoted from a published description of some experiments that he had made in this direction. He insisted that cataphoresis was only one part of electrolysis used to pass elements from the positive to the negative pole, while electrolysis will decompose compound bodies into their elements; each pole having a separate action.

Dr. G. Betton Massey said that the Association was indebted to Dr. Wheatland for this clear presentation of a subject that had not been very clear to many. In a recent case in which he had desired to drive iodine into a man's skin over a painful node he had made use of a piece of plate carbon as an electrode. It was laid upon a pad of absorbent gauze saturated with weak Lugol's solution, as the full-strength solution was too dark. The positive pole was connected with this electrode. On turning on the current the portion of cotton nearest the carbon surface became quite black, and when kept up sufficiently long, the part next to the patient became pure white. On using the negative pole, the patient complained of far more pain from the same amount of current, and far more than could be accounted for by the fact that it was the negative pole. After ten minutes the discoloration of the skin was more intense than by any ordinary painting of the surface, showing that pure iodine had been forced away from the negative pole towards the patient. At the same time, the portion of the body near the plate became white. The patient said that he knew a physician in Chicago who was driving in iodine by electricity, and on communicating with this man it was learned that he used the positive pole. Again, Dr. Massey had tried the positive pole, but with no better result. Cataphoresis was, of course, away from the anode toward the cathode, but there were two forms of cataphoresis, which complicated this subject, as one form was molecular. He thought it was still not proved that iodide of potassium, as a salt, could be driven into the tissues.

Dr. Robert Reyburn said that he did not see how there could

be any doubt that iodine and acids appear at the positive pole and alkalies and hydrogen at the negative pole. The experiments presented in the paper, and numerous others, seemed to him to prove this point. When substances are placed in solution and are brought in contact with the galvanic battery, the action is the same in the body as anywhere else.

Dr. Wheatland, in closing the discussion, said that there was not much difference in the position taken by Dr. Newman and himself. He hoped the members of this Association would not continue to use the positive pole for driving in iodine. He had been unable to find anything conclusive in the literature. Before making these experiments his knowledge of electricity and chemistry had led him to believe that one could not use the positive pole indiscriminately. Cathoporesis was really a misnomer; it was more accurate to speak of a *phoresis*, as this remedy meant that the substance removed from one pole to the other, and not necessarily to one particular pole. If an element were negative it should be connected with the negative pole; if positive, it should be connected with the positive pole.



RESULTS AND TECHNIQUE IN TREATING EPI- THELIOMA WITH X-RAYS.*

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Since the early announcements of the potent and almost miraculous effects of X-rays upon disease, the medical profession has made some remarkable advances. The fact that these advances have been made through many different and independent channels attaches more than ordinary interest to the subject. It has been repeatedly said that medicine is yearly advancing toward a more scientific basis and is gradually losing its empirical nature. Within the last few years electricity has had much to do with the scientific development of medicine, and no one particular part of electricity has brought out more practical applications or more encouraging results than the study of X-rays.

In this connection it is also interesting to note that in the history of medicine all improvements, discoveries, and treatments of a radical nature have always met with drawbacks and adverse criticisms by those who consider themselves conservative. The X-ray was no exception to this, and even today, after undisturbed clinical experience has demonstrated its therapeutic value in certain diseases, we have those who will not believe. To permanently establish its claims, therefore, the X-ray must pass through the same crucial tests and stages to which other therapeutic agents have been subjected. However, the favorable results obtained by thousands certify only too clearly to the fact that, as a valuable addition to therapeutics, its position has been well established.

While we have no specifics in rational medicine, we take it for granted that there is no longer any doubt as to the practical value of the X-ray in the treatment of certain forms of disease. Probably in no disease has the X-ray demonstrated its peculiar power better than in the treatment of epithelioma.

* Read before the American Roentgen Ray Society at Chicago, December 10, 1902.

Much has already been written about the use of the X-ray in the treatment of this disease, in fact some may say that this subject has been thoroughly exhausted, nevertheless, personally, we realize that, owing to the vastness of the subject, it will be impossible for us to comprehend in this paper the entire field of X-ray therapy as applied to this particular disease.

We must not forget that, although we have worked with the X-ray as a therapeutic agent for a number of years, we do not yet know just what the action of this agent is upon the tissues of the body. Much remains to be done. Scientific investigations of the many details of the different methods now in use are to be encouraged. Those of us who are actually in the field deplore the fact that too much has been said concerning this treatment without weighty consideration; without the application of scientific proofs; we may say that the apathy of the medical world towards accepting the results of this treatment is largely due to the haphazard and indiscriminate methods of using the X-ray, which have been productive of nothing but immature and unscientific deductions. Indeed, it seems that those who are in a position to know least about the X-ray from a practical standpoint, are loudest in talking about it.

Of course difference of opinion is always allowable, but much of the difference of opinion relative to the subject arises from and is primarily due to the fact that there is a lack of scientific knowledge in possession of those who make attempts at working in this line.

Concerning the methods of treating this particular disease there seems to be a wide difference of opinion as to their relative value. Several methods have been announced and each of these has its advocates. Some have recommended the use of a low-vacuum tube, while others with equal force have lauded the value of the high-vacuum tube; still others have stated that either a high, medium, or low vacuum tube could be employed with equally good results; in other words, that no distinction need be made between the vacuum of tubes used for this purpose. We may analyze these various methods as far as they go.

Observation teaches that most X-ray workers treat their cases after a stereotyped method, using little or no reason or logic. Common sense certainly would teach one that there

must be a decided difference between the rays emanating from a low-vacuum tube as compared with those coming from a high-vacuum tube. Indeed there is a very great difference. When the one is proper for a certain case, to use the other certainly would be very improper. Therefore the recommendation of the indiscriminate use of either the high or low tube is simply a makeshift. No valid reason can be given for such procedures. The serious objection to this method then is that it is not exact, and the study of the X-ray will not be advanced very rapidly by the use of such methods. We wish also to emphatically refute the statement made by some that the high tube is generally to be preferred in the therapeutic uses of the X-ray, "because it is not as dangerous as the low tube." Nothing more fallacious than that can be announced. Notwithstanding the plausibility of the argument advanced by those who use the high tube exclusively, that only such a tube should be used, because they "have obtained good results," we claim that this distinction is based upon an incomplete acquaintance with the dangerous as well as the good side of X-ray treatment. We do not dispute the fact that a high-vacuum tube can be used and good results obtained, but it certainly is not proper to use a high tube when a low tube will answer the purpose, and that too without the accompanying dangers incident to the use of the high tube. Only those who have had sad experiences with the use of the high tube can appreciate the danger to which we subject patients in every exposure. A tube whose vacuum is just high enough to penetrate the tissues to be affected should always be used. A higher vacuum would certainly be contraindicated, for if the rays penetrate the deeper tissues these also will be markedly affected, although they are not pathological and it is not desired to treat them. Inflammation of deep tissues as well as surrounding tissues is to be avoided. Marked irritating effects have been produced upon the brain by treating an epithelioma or a lupus of the head with a high-vacuum tube.

In view of these facts, and many more, we must conscientiously decry the indiscriminate use of the high tube.

It may be argued, since the matter of studying the vacua of tubes is a relative one, or rather a subject which involves the personal equation, that we have no right to oppose any method unless we know all the particulars pertaining thereto.

Be that as it may, we will admit that in determining the relative vacuum of a tube we have no absolutely accurate method. Probably the simplest method is to rely upon the ability of the tube to back up a spark gap between the prime conductors of a generator. We realize that this method is not at all accurate, depending so much upon physical conditions and individual experience, but nevertheless the simplicity of this method commends it, and with a fair amount of study it will be quite useful. According to this method the writer calls a low tube one whose vacuum is equivalent to an air spark gap of less than three inches. That is, the current would rather excite the tube giving distinct and clear hemispheres in the bulb, then jump over an air space of three inches between the prime conductors. Such a degree of vacuum we use and recommend in the treatment of epithelioma.

A few brief statements with regard to apparatus. It may be said that since good results have been reported from the use of both static machines and induction coils, as X-ray generators, that either is equally good for X-ray therapeutic work. Having used both forms of generators and that too of different sizes, almost daily for several years, we have found that the greatest drawback to the use of the static machine is our inability to vary or control the strength of current. On the other hand, in the coil the quantity of current can be regulated at will. We can also pass through the tube any quantity of current irrespective of the vacuum, when a coil is used. The writer has made use of quite a number of interrupters on the coils, but his preference is the rapid mercury turbine interrupter attached to a twelve-inch coil, taking from one and one half to four amperes in the primary on the 110-volt circuit. In using a coil, connection may be made to the tube without the use of a spark gap in series; however, some tubes will excite better when one or more spark gaps are used. In using the static machine, it is always advisable (due to the fact that we have very low amperage) to use at least two series spark gaps between the machine and the tube.

This arrangement of series spark gaps will overcome many difficulties usually met with in fine adjustments of vacua.

After all, however, it is not so much the exciting apparatus which is the vital part of an X-ray outfit, but it is our ability to

maintain a constant vacuum in the tube which is the factor of greatest importance.

Ideal results can only be expected and obtained when the tube is so controllable in its vacuum that we can duplicate the treatment at each sitting.

To prevent ourselves being charged with commercialism we must refrain from writing more specifically about apparatus.

A perfect understanding of definite dosage of X-rays is still to be desired. Only when we have compared results extending over quite a period of time and covering many cases, can we establish a rule as to the controlling factors; namely: quality of tube, a distance of tube from parts treated, time of exposure, frequency of exposure, and exciting apparatus.

It must also be remembered that careful individualization is of paramount importance. This cannot be dwelt upon too much. We must not forget the fact that some individuals may have more than one disease at one time. Patients have been brought to us who were supposed to have epithelioma or lupus, when in reality they also had syphilis. One of the most important things to consider then, if the efficiency of the X-ray is to be judged, is a proper diagnosis.

There is reason to believe that, in nearly all cases of so-called epithelioma or lupus growths which have been under X-ray treatment for some time without showing any marked signs of improvement, that we may be suspicious that another condition is an existing concomitant.

The time of exposure, aside from the factor of idiosyncrasy, which undoubtedly must be considered, depends primarily upon the intensity of the X-ray. The quantity of rays developed in a tube depends upon the amperage of the generator. If a powerful ray is used the time of exposure should be short, and when a weak ray is used exposures may be relatively long. According to the nature and severity of the case the use of a strong or weak ray would be determined. Since it is our aim to produce dermatitis in all these cases, treatments are given daily, from the beginning. Exposures ten minutes, with the tube placed from 4 to 6 inches from the affected part. Patients are treated in this manner until a certain response is obtained as indicated by the development of redness, heat, and itching in the parts exposed, when treatments are stopped for from two to seven days, according to the degree of reaction, after

which we expose the patient again to the same kind of rays. After the first reaction there is usually less liability to active dermatitis.

During the administration of the treatment all parts not to be affected by the rays are protected by a mask of thin sheet lead, which has been especially made for this purpose. We wish to emphasize that the occurrence of the symptoms which result after X-ray exposure and which have been termed "dermatitis" or "burn" do not retard the progress of cure. In all unbroken conditions a continuous presence of dermatitis is of great value and will accomplish more than when we do not produce it. In all open or ulcerated conditions we need not stop at producing a simple dermatitis, in fact, then we are just beginning to do the condition good, and by continuing treatment until an actual burn develops, all will be surprised at the good result.

The most striking illustrations of the value of the production of dermatitis are furnished by patients themselves. It is not an uncommon thing for us to hear patients, who have been burned, most loud in expressing their belief in the value of the X-ray treatment. The results to them are so pronounced. In considering the conditions under which dermatitis may develop in any individual, it may be stated that observation teaches that not only do different persons differ as to susceptibility, but the same individual's susceptibility will vary under different circumstances.

It is important in this connection to bear in mind the fact that when we use the X-ray as a therapeutic agent, we are not necessarily limited or confined to its action alone. In many cases the X-ray treatment may not be deemed alone sufficient in bringing about favorable results, and, although many cases are susceptible of cure with it alone, any adjuvant treatment, such as constitutional medication and local cleansing, is considered imperative. Proper general or systemic treatment is as much indicated when the patient is under X-ray treatment as at any other time. Precautions should be taken in regard to reasonable care of the person in the interim between treatments.

We therefore lay great stress upon the necessity of treating the individual and not the disease.

In giving a summary of cases under this treatment they

should be considered relatively. All things are relative. Since using the X-ray therapeutically, the writer has treated a total of 103 cases of epithelioma. Of this number 61 cases occurred in men and 42 in women. Our experience then would lead one to believe that this particular disease is more prevalent in men than in women.

Realizing that tabulated statistics are always difficult of understanding when read, and at best are always dry, as concise a summary as possible will be given.

In about one-half of the cases which have come under our observation the disease has been upon the surface and therefore very readily brought under direct influence of the X-rays, and the progress of the condition could be observed frequently. In the rest the disease has been in internal parts of the body, and unfortunately these areas are neither directly accessible for X-ray treatment nor for observation. The clinical investigation of each case was conducted in as rigid and scientific a manner as the individual case permitted. No stone was left unturned in order that definite conclusions might be arrived at.

The cases range in age from eight to ninety-two years. The majority (68 cases) were over forty years of age. As a classification based upon the length of time the disease has been active is unscientific, and at best is only comparative from a narrow point of view, we deem such a classification unnecessary in this summary. The average length of time under this treatment was four months. However, some cases were pronounced symptomatically cured after taking less than one month's treatment. On the other hand, several of the more severe cases were treated more than six months, and in one case the treatment extended over eighteen months. To detail all the cases, or even a small number of them, would take up more time than is allotted; therefore we shall group them according to location. No effort is here made to make a distinction between primary or post-operative cases, because if the X-ray treatment is indicated, it will bring about favorable results in either class.

In 76 cases the disease was located in some portion of the head, and involved only the upper part of the body. The part most affected was the mouth and its adjacent tissues. Under this heading there appear 68 cases. In 8 cases involving the

eye, results considered good in 5; poor in 2; failure in 1. In 13 cases involving only the tongue, results considered good in 7; poor in 2; failure in 4. In 5 cases involving the vagina, results good in all. In 1 case involving the bladder, results failure. In 20 cases involving the fauces, results fair in 6 (disease seems to have been checked); poor in 6; failure in 8. In 2 cases involving the uterus, results good. In 22 cases involving nose and cheek, results good in 10; poor in 7; failure in 5. In 21 cases involving one or both lips, results good in 10; poor in 7; failure in 4. In 11 cases involving other parts of the body not mentioned in the above, results good in 5; poor in 2; failure in 4.

Although we have treated a great many cases of epithelioma of the fauces and all, without exception, have been benefited at the beginning of the treatment, we frankly admit that we cannot report any permanent cures. Possibly failure to obtain cures in these cases was due to the vital location or too extensive progress of the disease before coming under this treatment.

Of course it would be considered remarkable if all those included in this whole list got well or even improved. Due to the fact that the treatment was not undertaken early enough, some have died from infection or general carcinosis; others have died from some intercurrent disease, such as pneumonia, heart failure, or some form of renal trouble. Some we have lost track of, so that the final results, whether good or bad, cannot be determined. For sake of argument the latter have been classified among those who were not benefited by this treatment.

In the attempt to form an opinion as to the percentage of cures obtained by this method, many obstacles are met. While it is impossible for anyone to produce figures concerning this which would be exact, we can state that in the majority of cases our efforts have been successful. Considering the length of time these patients had suffered and that the great majority were extremely far advanced in disease, that many were pronounced incurable by other methods, that many were recurrences, and in others the disease was situated in localities where most unhygienic and unideal conditions prevailed, it is only fair to assume that such results could not have been obtained by any other treatment.

We do not claim that all cases favorably reported are absolutely cured, but we do claim that no evidence of the disease was discernible in all the cases discharged. We choose to call these symptomatic cures. It can be stated positively, however, that in all uncomplicated cases of superficial epithelioma, where the diagnosis has been made early, the results due to X-ray treatment, have been such as to warrant the use of the word "cured" in its fullest sense. And in curable cases the X-ray is as nearly specific as any therapeutic agent in use to-day.

Taking for granted that in the majority of surgically recurrent cases the return of the trouble is due to a proliferation of epithelial cells from the original or primarily affected area, every surgical case should be placed under X-ray treatment within from one to three weeks after operation. Only by the early and vigorous use of this method can we hope to forestall more serious trouble.

We have not exhausted this subject. The praises due the X-ray could be prolonged almost indefinitely, the results have been so uniformly good and numerous.

No matter what may be the ultimate answers to the many questions which vex the medical profession to-day concerning the X-ray, it must be conceded that this force in the treatment of epithelioma is a pronounced success, and a knowledge of its merits should, therefore, be more thoroughly disseminated.

The co-operation of the profession in general should be given in order that humanity may reap the benefits.



THE THERAPEUTIC USES OF THE BRUSH-DISCHARGE, AND INDUCED HIGH-FREQUENCY DISCHARGES OF VACUUM ELECTRODES AND GEISSLER TUBES.*

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The two electrical modalities which we have under consideration are similar in their effects, but dissimilar in the method of production and other characteristics.

The term, brush-discharge, is an unfortunate one; because in electro-physics it is applied to an electrical discharge from one terminal of a high-potential apparatus, without regard to the substance of the conductor between the terminal and the course of the current, while the term as used in electro-therapeutics applies to a discharge which passes some distance through a substance of very high resistance that may or may not have a metallic terminal from which the discharge is emitted.

The only source of electrical energy employed in therapeutics capable of passing a current without disagreeable consequences through such resistance is a static machine. The disparity of amperage and voltage is such with currents from other apparatus that their employment is either impossible or impracticable. The intensity, volume and effect of the discharges vary with the speed and capacity of the machine, the length, diameter and character of the resistance electrode, the atmospheric conditions, the character of the material, between the discharges, the patient, the nature of the grounding and the insulation.

(1) The most effective discharges are obtained from powerful static machines, the volume of the discharge being greater from the machines having the larger number of revolving plates, other things being equal.

(2) The material of which the electrode is made is of great importance, in order that it may deliver a discharge that is

* Read before the Clinical Society of the New York School of Physical Therapeutics on November 30, 1902.

fine or interrupted as desired and without a disruptive quality, as sparks. Wood is the best material, either the white portion next to the bark, of the indigenous soft maple or some other wood of even texture, as white-wood or holly. The red or central portion of the maple is not nearly so good, as the texture is porous and rapidly dries, which makes it a too poor conductor. The electrodes may be frequently soaked in water or better still replaced by new ones, for as they become dry the discharge becomes less vigorous.

During prolonged administrations the electrodes, when properly conducting a current, as during the summer or when they have become thoroughly heated, will be disagreeably hot. Under these circumstances the discharge is very rich and effective. It will be found also that during the winter, when the temperature of houses ranges below 70° F. the discharges become feebler though the output of the machine is greater. The temperature then cools the electrodes and renders them poor conductors. At the same time the air is dried and becomes a more perfect dielectric.

A hot and humid day in summer if the machine can be made to excite a current is the time when the brush-discharge is most potent, a fortunate coincidence for it is upon such days that the wave currents and sparks are of little avail.

Heating the electrodes during cold weather soon causes them to become so dry as to be ineffective. It is then best to replace the longer part of the electrode with a new stick. The effect upon a wet surface or over wet clothing is nil. Cotton or linen, when an outer garment, materially impairs the action, when strong effects will be produced by placing one or more thicknesses of silk or woollen cloth over the surface to be treated.

Care should be taken that not too many thicknesses of wool or silk intervene, for, if there are too many, they might ignite. Celluloid hair pins for the same reason should also be removed.

(3) The opposite side of the machine to which the patient is connected should be grounded to the water pipe, and the end of the electrode held by the operator should be connected by a distinct ground, as the gas pipe, if the strongest effect is desired.

(4) The insulation of the patient should be as nearly per-

fect as possible. Machines having the capacity of those above described should be provided with insulated platforms having glass or vulcanite legs, at least nine inches long.

(5) The poles of the machine should be widely separated before the patient is connected or the machine started, because it is desirable that the patient hold the shepherd's crook; when if a spark should pass because the poles are too near, the shock to the patient from such an accident might be discouraging. For application of the brush-discharge special electrodes may be employed.

The high frequency discharges from vacuum and Geissler tubes are induced discharges produced from high potential sources; static machines and coils employed for X-ray purposes serve the purpose. The induced character of the discharges does not require that the patient be insulated.

The tubes employed are of low vacuum and may be either constructed of the Geissler pattern, having a metallic connection from without, or without wire connection to the interior. The effect is practically the same, but when the wire within is carried to the end of the tube, the discharge is somewhat more uniform to the tube over the whole surface. This, however, is not of practical advantage in most cases.

An adjustable insulated handle of solid glass or vulcanite is a convenience permitting the operator to handle the electrode during an administration without lessening the discharge from the current, which would otherwise pass off through his person.

When a static machine is employed to produce the discharges the positive pole is grounded, the electrode connected with the holder is either placed in some cavity of the patient, or held by the operator and connected with the negative pole. The spark-gap is then closed to about one-half inch and the machine started, after which the spark-gap is regulated to the condition of the patient.

If a coil is used for exciting the tube, a connection may be made from the negative terminals of the coil, connections being made with the patient as before. The current controller should be provided with many contact points with resistance changes slight or the step-up may be unpleasant to the patient. The current, when using a coil, may also be regulated by making use of a Geissler tube three or four feet

long, one end of which is attached to a side of the coil, and provided with a ring to which the operating electrode may be attached. The ring can be moved to and fro from the terminal to regulate the discharges, which will then be of secondary induction. In that case, the large tube should be attached to the positive side of the coil.

The high frequency discharges from the two sorts of apparatus differ somewhat in the chemical, heat and vibratory effects. The chemical effects are most marked with the coil current of greater amperage; and the vibratory effect is far greater in frequency, intensity and vigor when derived from the static machine and may be easily regulated by varying the length of the spark-gap or the speed of the machine, or both, while, with the coil, it is apt to be constant.

These higher potential discharges have several characteristics in common.

The static brush-discharge and the high-frequency discharges from both coils and static machines all possess the qualities characteristic of all electrical discharges. Decomposition of the atmosphere takes place and, with other products, nitrous acid and ozone are evolved. The green violet and ultra violet character of the discharges, which vary with the degree of vacuum of the tubes, possess qualities also of undoubted therapeutic value.

The physiological actions of the discharges, while similar in many respects, differ essentially in others. The brush-discharge, like other static modalities, lessens the local hyperemia and congestion by inducing contraction of the arterioles, thereby relieving pain, diminishing swelling to a marked degree. The metabolic processes of the end organs are stimulated to greater activity and a healthy restorative action is induced. When applied for a long period, the effect is first rubefacient and later vesicant, producing painful blisters. From the nature of the electrical discharge the ozone and nitrous acid evolved from the close proximity to the tissue is distinctly antiseptic. In addition to these local effects, there is a marked tonic effect from its employment when a course of treatment is pursued for a prolonged period and the patient, for any reason, has been below the normal standard.

With the high frequency discharge from the vacuum tube

the local and constitutional effects are much the same, but possess certain advantages which determine its election for use in the several conditions. For example, when treating cavities of the body, such as the rectum and vagina, it is possible to place the electrode in the cavity leaving the patient for the indicated period of administration under the same conditions to apply the brush-discharge, would neces-

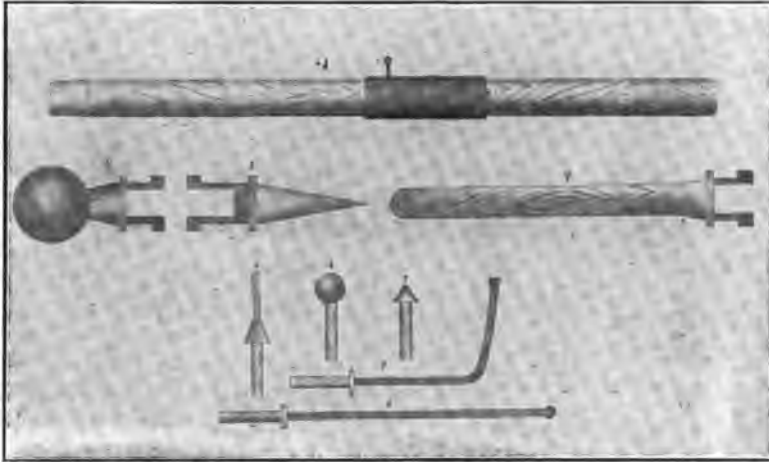


Fig. 1, handle of white-wood, 20 inches long and $\frac{3}{4}$ inch in diameter; fig. 2, wooden ball; fig. 3, wooden point; fig. 4, wooden terminal over which glass test-tube is to be placed; fig. 5, wire terminals (five wires); fig. 6, brass ball terminal; fig. 7, brass point terminal; fig. 8, vulcanite-covered wire brass-ball-tipped terminal for throat and ear; fig. 9, vulcanite-covered wire brass-ball-tipped terminal for making applications in other cavities.

sitate the use of a speculum and an electrode insulated to the terminal extremity from which the application was discharged, and at the same time necessitate the constant attendance of the operator during the period of administration. In addition the application, if the surface requiring treatment was extensive, would be prolonged.

For applications to the surface of the body, the brush-discharge is, as a rule, to be preferred. For the successful application of these modalities a variety of electrodes will be found convenient.

For application of the brush-discharge to the surface of the body the wooden ball electrode of maple, or other wood of even texture, meets all requirements, except when it is

necessary to make the application in a cleft or depression, as between the fingers or nates, in which case a pointed electrode will be required. A set of terminals have been devised which may be used from the extremity of a handle at least twenty inches long, of the proper material. This handle should be three-fourths of an inch in diameter, provided with a sliding tube having an eye for attachment of the grounding chain (Fig. 1), which may be moved to and from the extremity, increasing or decreasing the resistance as the case or conditions demand.

The terminal end is provided with a socket for adjusting any tip that it is desirable to employ in any given case. The brass-pointed terminal (Fig. 7) gives a fine, painless spray, which can be employed about the eye or any surface peculiarly sensitive to the application, or in the clefts and depressions of the body. The fine wire brush (Fig. 5) emits or receives a discharge even softer than the single point. The tip-ball (Fig. 6) emits a wider stream of discharge. Other metal terminals are also employed for use within the ear, nose and throat, or other cavities. Such are covered with insulating material, as glass, rubber tubing, or vulcanite, the wire extending from the resistance handle to small balls at the terminal ends (Figs. 8 and 9). With these terminals we are enabled to deliver the discharge in the cavities of the body. Fig. 8 is for making administrations to the larynx.

The technique of employing the Geissler or vacuum tubes is not difficult either with the static machine or coil. With the former it is not necessary to insulate the patient, as with other static modalities.

It has been demonstrated by both foreign and American observers that the larger amount of chemical rays are emitted when vacuum tubes are connected to the negative side of the sources of electrical energy. Therefore make negative connection with the electrode.

The discharging spark-gap is essential to the high-frequency discharges from the static machine, for without it there is no appreciable interruption,—no frequency.

To administer this modality, have the patient upon the table or seated in the chair; connect the cord from the glass electrode to the negative side of the machine, and if an application is to be made within the rectum or vagina, place the

electrode in position, or, if the operator is to apply it to the skin or some mucous surface, it should be held in readiness by the glass or hard rubber handle and the machine started. The spark-gap between the balls of the discharging rods should not at first be more than one-half inch. It may then be regulated to the condition to be treated. Two to three inches will be required in most cases for treatment of the vagina and rectum, and one-half to one inch in the fauces and on the surface of the body.

When using a coil, connect with the negative side of the apparatus or, if the alternating current is used, with either side. Having the patient in readiness upon the table or chair, get the electrodes in readiness as in the static administration. Then turn on the current gradually, starting from zero. It will be noticed that with currents of larger amperage the violet discharges are more numerous, that the sense of warmth is more pronounced, and the application to the surface, either through the clothing or when held at a sparking distance from the body, more painful than the static. This, however, can be lessened by placing in the circuit two multiple pointed terminals with provision for regulating the distance between the points.

There is undoubted advantage in some cases in the treatment of which a stronger chemical discharge is beneficial from the greater amperage of the coil. On the other hand, the positive vibratory effect of the static high-frequency which is easily appreciated by holding an electrode in the hands, has its advantages in overcoming local stasis and congestion.

Vacuum electrodes of various types and forms are employed for making applications of high frequency, all of which are adapted to both the coil and static currents. The set of glass vacuum tubes shown in the department of New and Improved Apparatus, in the February number of the JOURNAL, and Geissler tubes shown in the report of Society Meetings, in the same issue, are convenient electrodes for the application of high-frequency currents.

Therapeutically, the brush-discharge and high-frequency discharges are indicated in the same class of conditions. Wherever congestion and stasis are present, with or without the presence of germ life, these modalities are invaluable.

Enough cases of lupus have been reported cured by both modalities to establish their value in tubercular conditions.

The ozone so richly evolved at the site of application oxidizes organic life, acting as a powerful antiseptic.

The brush-discharge is especially adapted to the treatment of skin diseases. Lupus, eczema, herpes, acne, scabies, and allied conditions are wonderfully relieved and cured by its action. Many cases of prosiasis have been greatly benefited by its use. The high-frequency discharges have accomplished such remarkable results in the treatment of ulcer of the rectum, fissure of the anus, hemorrhoids, tonsilitis, and catarhal conditions, as to assure the modality wide recognition, when it becomes better known. The application of the brush-discharge within the cavities by means of special electrodes, assures it new fields for its use. In this manner it has already been employed in the treatment of otitis media.

The application of the brush-discharge to the early stage, of acute inflammatory conditions, rheumatism, sprains, and abscesses, as well as the swelling associated with fractured bones, meets with surprising results, and has not the unfavorable effect of throwing the muscles into painful contraction. If the method of employing these modalities is once understood as well as the indications, they will be universally adopted.

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Editorial.

WHY OBSTRUCT PROGRESS ?

IN a recent editorial an esteemed contemporary whose personal experience with the therapeutic uses of the X-ray is evidently not large, discusses the "Effects of the X-ray upon Cancerous Growths." He opens the consideration of the subject with the statement that "active experimentation with the Roentgen ray as a remedy for cancers continues to bring forth evidence both in favor of its efficacy and against it. The disposition of the editorial is, however, to inveigh against any possible cures from the employment of the X-ray, and to belittle the abundant evidence of success contributed weekly by observers to the medical press.

He repeats a case from a foreign medical journal from which he fails to draw a lesson, as did also the writer quoted. After observing that "no changes had taken place macroscopic or microscopic," it is admitted that the tumor "underwent diminution in size in addition to becoming more movable on the subjacent parts." He adds that the above changes were difficult to explain. In such statements the interested searcher after truth discerns a prejudice never shown by the fair-minded. Indeed, the very same conditions of change noted in the above case are the rule in all cases subject to systematic exposure to the X-rays, and offer a scientific and sufficient argument for the employment of the rays to all cases before operation. One thing is certain, surgery has proved a failure in the treatment of cancer in the past, but is ever ready to embrace any new venture with the knife such as tying off the carotid artery, but too often is heedless of measures not surgical that may prove valuable. It is already well established that the Roentgen ray *does* very materially affect the cancer growth. To the present time, however, experience has not been large in other than inoperable and recurrent cases, which have given small opportunity of showing successful results, and it is certainly unfair to judge radiotherapy from that standpoint.

The brilliant results so far obtained in the treatment of epithelioma and rodent ulcer are most encouraging, and unwise is the surgeon who would be recognized in the future as a fair-minded authority if he opposes facts.

There are already enough cases that have been rayed both before and after operation to form a basis for future judgment. Truisms that should be at once adopted are: (1) that every cancer should be widely rayed for a period of not less than one month before the operation; (2) that the parts should also be rayed again as soon after the operation as the wound shall be fully healed, and before, if the repair is not prompt; (3) that in no instance is it wise in operable cases to neglect or advise against operation when there is a distinct tumor beneath the integument.

Those who are employing the X-ray in the treatment of advanced cases of recurrent cancer in the female breast have been impressed by their inability even by extensive raying to prevent metastasis. This fact, together with confidence that the rays used before and after operation are effective, is sufficient warrant for the practice, already instituted by some surgeons, of leaving the axillary glands not already infected.

If those who are disposed to criticise and decry will thoroughly investigate there is evidence already to guarantee that the X-ray will add to, and not detract from, the triumphs of surgery.

* * *

MANAGEMENT OF CHRONIC INFLAMMATORY CONDITIONS.

PROBABLY no other class of conditions so taxes the ingenuity and time of the physician who has not become familiar with the employment of the so-called physical measures than chronic inflammatory conditions. The list of affections termed "chronic," which *are*, when treated by the old method of drug giving, rest and the use of external applications, includes a large number of cases that may be promptly relieved by more rational methods.

In most cases, stasis has been so long present, associated with usual consequences, that some *vis a tergo* of greater potency than the measures referred to is demanded to restore a normal metabolism.

Stasis is not generally recognized as a condition to be removed before restoration can commence. When Morton said "fire long static sparks into the site of the inflammatory process" men smiled because they did not appreciate the action or necessity for action in such conditions. It has been often said that static sparks obtund pain.—They may, because by producing muscular contraction they relieve stasis, forcing onward the blood stream. A force which produces repeated contraction of the muscular structures, including the muscular coats of the vascular system, is best calculated to at least temporarily relieve a congested area. Pressure being thus removed pain is diminished; not obtunded. Action constitutes a great principle in the treatment of chronic inflammatory conditions. Electrical currents induce when locally applied such muscular contractions as are calculated, when properly administered, to produce most favorable conditions for the relief of stasis and the induction of healthy metabolism. The systematic application of heat, cold and mechanical vibration are also powerful measures for the relief of chronic inflammatory processes. When it is more generally appreciated and taught in medical colleges that these natural forces have a larger place than has hitherto been accorded them the list of chronic conditions, so often rated incurable, will be greatly diminished.

* * *

A CORRECTION.

THROUGH a misunderstanding R. G. Brown, A. I. E. E., of 158 Montague Street, Brooklyn, was appointed Chairman on the Committee on Meters of the American Electro-Therapeutic Association and Robert Reyburn, M. D., of Washington, D. C., Chairman of the Committee on Electrodes. The mistake has been corrected and Mr. Brown will act as Chairman of the Committee on Electrodes and Dr. Reyburn Chairman of the Committee on Meters.

Progress in Physical Therapeutics.

GYNECOLOGY AND APPLIED METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D., PHILADELPHIA, PA.

Medicated Galvanic Current in the Treatment of Tubercular Glands, Goiter, and Uterine Fibroids. By M. O. Terry, M. D., Ex-Surgeon Gen. U. G. N. Y., etc. Medical Times, November, 1902.

. . . I wish to illustrate and show the methods by which cervical tubercular disease can be made to disappear as well as other growths without the knife. Glands about to break down must be surgically treated, but cervical enlargements, it matters not how many there may be, whether one or fifty, will quite readily disappear under the medicated galvanic treatment. By "rapidly" I mean in from three months to two years. The greater number will disappear within ninety days. There will be some which will extend well toward the latter period named.

If it be true, by this treatment, one can get the results, which have been my observation for so many years, what a blessing to the young women who are ever on the alert, conscious of deformity and desirous of avoiding scars. Deformities must more or less necessarily follow the use of the knife, as most practitioners and surgeons know, in order to eradicate these not at all uncommon growths.

The water used for the electrode contains the chloride of ammonia and the tincture of iodine. I am not particular as to the quantity or strength of these solutions. Half an ounce of the chloride of ammonia and 15 drops of iodine to a quart of water will be sufficiently accurate for illustration.

As to the Method of Application.—The positive pole is to be placed at the back of the neck and the negative pole over the enlargements on either side. The medicated current can usually be tasted at once by the person under treatment. As to the strength of the current it will depend largely upon the individual. Patients can take from 20 to 50 milliamperes.

Without a galvanometer the patient can determine the proper strength of the current most suitable, for the sensation on application will be simply a mild degree of warmth to that of burning. From 10 to 15 minutes is usually the length of time for treatment and a repetition should be made, if possible,

every five days, until marked improvement is noticed and then at intervals of one or two weeks.

The same treatment is applicable in cases of goiter. Good results may be obtained in from three to twelve months; the same as for cervical enlargements. In girls a goitrous condition will disappear absolutely. In persons more advanced, changes for the better are slower and greater perseverance is required.

As to the treatment of fibroids of the uterus by the medicated galvanic current, although it has been stated by some authors that this method of cure has been largely discontinued by many who formerly used it, yet I am quite sure that in well selected cases any surgeon who has the patience to continue this treatment, awaiting the gradual disappearance of the enlargement, before resorting to the more dangerous plan of excision will feel as satisfied over the results as the patient will be grateful.

The positive pole sponge is placed over the abdomen and the negative pole—a copper electrode—is passed into the uterus as far as it will go. The vaginal part of the electrode should be insulated, which can be done by slipping over it a piece of rubber tubing, pushing it up to the neck of the uterus after the electrode has passed in as far as it will go.

In case of a bleeding fibroid or a hemorrhagic condition incident to fibroids the positive pole is used for the uterine cavity until that feature of the case is corrected. For the reduction of the growth, however, I depend more upon the negative pole in the uterus, for this is really the dissolving pole.

The electric pad used for the abdomen should be of sufficient size to cover the borders of the growth. Patients can take from 200 to 500 milliamperes. Here, too, the patient is able to state the amount of current he can tolerate without the galvanometer. The interval of treatment for these cases is from twenty to twenty-five minutes. I usually give them for twenty minutes and the last five minutes a small sponge is applied over the sacrum in place of the abdomen. This has the effect of relieving backache, the current from this direction seeming to act as a tonic and its passage through the uterus posteriorly adds value to the efficiency of the treatment. When applied from the sacrum to the uterus it is always given much weaker—usually from 50 to 70 milliamperes.

Hemorrhages are frequently stopped after two or three treatments and uterine fibroids have been reduced to such an extent that they remain as innocent growths, not causing any trouble. I can now recall one of nine inches being reduced to four and a quarter; one of six inches to three; and since August, 1901, to August, 1902, I have given a woman twenty-five treatments for a fibroid of 6 1-2 inches internal measurement, which has been reduced to 2 7-8 inches.

[Dr. Terry's paper further recommends galvanic treatment of the early stages of prostatic hypertrophy, either by external application to the perineum and sacrum, or by Newman's electrode to the urethra and a positive olive to the rectum].

In the discussion Dr. Wm. H. Diefenbach pointed out that the anaphoric diffusion of iodine, while at times efficacious in pure adenoma of the glands, was not so effective when the latter were hard and fibrous. In the latter cases he had been led to use ichthyol, which was diffused anaphorically like iodine, with good results, as also in ankylosed joints and contracted muscles and tendons following fractures. Ichthyol anaphoresis was also successfully employed in a recent case of erysipelas, checking the spread of the disease and curing it within a week. He usually employed a twenty per cent. solution.

The advantage of using galvanic diffusion instead of simply painting the lesion rests in the fact that the remedy can be carried deeply into the tissues, and as the lymphatics are supposed to be the principal seat of the streptococcic invasion we are able to reach the root of the evil.

The speaker urged further experimentation in electric diffusion, and called attention to the production of local anæsthesia by cocaine and to the value of mercuric cataphoresis in specific cases.

[Dr. Terry's paper contains an interesting contribution to the subject of percutaneous anaphoric diffusion of iodine in the treatment of the tubercular glands of the neck and enlarged thyroids. The value of this method in the treatment of goiter was affirmed a number of years ago by the late Hunter McGuire of Virginia, who also understood that the negative pole was the proper one from which to diffuse iodine. In the method employed by Dr. Terry it will be seen that another haloid, chlorine, was added to the ions used, with what necessity is not evident. That it would add to the irritating effect of the procedure is more clear.

The editor, after considerable experience with the method described and the mercuric cataphoresis method described elsewhere in this number of the journal, is convinced that the latter is far quicker in results and presents a more definite campaign against the disease. Zinc-mercury cataphoresis is also equally adapted to the worst cases after abscess formation and the development of open sinuses, and is even more easily applied in the latter class of cases].

DISEASES OF THE ALIMENTARY CANAL.

EDITED BY WALTER H. WHITE, M. D.

Electricity in Medicine and Surgery.—By Boardman Reed, M. D., International Journal of Surgery for November, 1902.

Until within forty or fifty years both electrotherapy and hydrotherapy were very much under the ban; they were not recognized by the regular medical profession. Though not tabooed quite so emphatically as homeopathy, no practitioner stood well with his more orthodox brethren who made a large use of either. On the same principle, we once heard a physician whose erector spinæ muscles were unduly developed, object to a medical neighbor as not in good professional standing, citing as one proof of his irregularity that he was accustomed to "prescribe the oil of erigeron."

Hydrotherapy, having been taken up and sanctioned by the profession in Germany, has been fully accepted in this country, as in most countries. Electricity has made its way more slowly, and up even to the present time has encountered much bitter hostility, which may be considered unreasonable if not, at times, discreditable. Electrotherapeutics is often disparaged or openly condemned, even to-day, despite the good constantly accomplished by it in various lines and the remarkable achievements of the Roentgen ray. The surgeons have in the past very generally objected to its encroachments upon their field, and in part at least from a real belief that in pelvic cases, especially, it not only failed to do good, but even aggravated many conditions and increased the difficulties of the surgeon who was called finally to operate. The electro-gynecologists have often retorted that they frequently cure by electric methods the pelvic pains which cutting operations had only made worse, besides actually effecting the absorption of inflammatory exudations, etc., without mutilation and with comparatively no danger to life. Both believe what they allege, for each sees the poorest work, the failures and worse results—rarely or never successes—of the other. And the physicians not trained to the use of electricity or equipped with the bulky, intricate and expensive outfits required by the expert electrician, sometimes find it easy to become convinced that therapeutic grapes from these particular sources are sour.

But just as no man is competent nowadays to attempt major surgery without an adequate training for it, so no one, be he surgeon or physician, would be justified in applying electric cataphoresis with high currents under anesthesia unless thoroughly instructed both in electrophysics and in the technique of these special applications. Moreover, an expert

anesthetizer should be depended upon not only to administer the anesthetic, but also to decide how long it can be safely continued, unless the electrician is himself sufficiently experienced in such really surgical work to decide this vitally important point.

As to the Roentgen ray treatment of cancers, it seems to be full of promise, and even many of the most conservative surgeons have reported well of the preliminary experiments made with it. The profession will await with great interest future developments as to its possibilities.

The Future of Electro-therapeutics.—British Med. Journal, January 3, 1903.

Owen thinks electro-therapeutics has suffered from the apathy of the profession and has too much fallen into the hands of quacks. Its standing is not what it should be, either with the public or the profession. He draws a picture of the average practitioner looking up his old magneto-electric machine as the usual idea of applying electricity, and he recommends a large central electric institution in London to which cases could be sent by physicians to be scientifically treated, having every appliance and being the headquarters of the Electro-therapeutic Society.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

Locomotor Ataxia.—By Dr. Curran Pope, Alienist and Neurologist, 1902.

“Pope advises a generous diet, change of occupation, so as to avoid arm or leg strain, worry, care, etc., general hygienic measures, and for the drug treatment the only remedy he has found useful is nitrate of silver in 1-6 to 1-4 gr. doses three times daily one or two hours after meals. Iron, arsenic, quinine, cannabis indica, and glycerinated phosphates can be used for their tonic effects. Strychnia should be generally avoided. He has little faith in serum-therapy. Morphin may be used for the crises and other systemic treatment where indicated. Hydrotherapy is advised and the details given. He employs half-baths, douches, etc. Electricity has been found useful in his hands, especially static electricity applied to the spine, extremities, etc., the sparks being as heavy as the patient can bear. Especial care should be given to the anæsthetic regions, the soles of the feet, hips, etc. Lately he has been substituting high tension currents for the insulation and head shower and finds it has a marked influence in improving the general nutrition, removing the lightning pains

and promoting a feeling of well-being. Next to the static current he thinks the galvanic, with the strength of 10 to 30 milliamperes, from the nape of the neck to the feet or labile to spine followed by a stronger current from a large pad over the lumbar region, or a current from the abdomen to the nape of the neck or lumbar region. He does not explain the rationale of the action of electricity and thinks it more or less empiric, but believes that it has decidedly good effects. He believes in massage, and knows of no one agent that satisfies the patient as well as this, and in a few cases he has found suspension, though generally disused, still of value. Gymnastic exercises under proper supervision are of value, giving care, however, not to fatigue. He gives details as to these and says in conclusion that the disorder cannot be treated by the general practitioner, owing to the character of the apparatus, time, etc. No case should be considered hopeless, but every case will require close attention and individual study and the utmost patience and care on the part of both physician and patient."—(Jour. A. M. A., Sept. 20, 1902.)

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

The Use of Argyrol in the Treatment of Acute Gonorrhea.
G. K. Swinburne, Medical Record, New York, October 11.

Argyrol has decided gonococidal powers; it has a decided effect in reducing and allaying inflammation of the disease; it can be used safely in almost any strength, and at any stage of the disease; the injection can be repeated almost as frequently as the physician desires. Writer has not seen any unpleasant symptoms due to the use of the drug, and it seems to be one of the most valuable new remedies.

First, we object to the term of stricture of large calibre, as large calibers exclude stricture, and create the suspicion that a temporary spasm may be mistaken for an organic stricture. Next, we object to cutting operations in organic strictures, as irrational and not curative, and believe we are justified in this by the successful treatment by electrolysis in about 2500 cases of urethral strictures, and the fullest investigation of the statistics by a reliable committee. About prostatic operations we find a diversity of many authors, each preferring his particular method. However, the address is so excellent that every reader will be glad to have it investigated. It has been published in the New York Medical Journal for October 11 and 18, 1902.

Adrenal Chloride in Urethral Work. S. Leon Ganz, Philadelphia Medical Journal, December 13.

Andrenalin has given good results after posterior urethrotomy. However, the author says, the cases need watching for untoward symptoms, and thinks the drug is limited to the same indications as for mucous membranes in other localities.

Instruction to Patients Afflicted with Syphilis and Gonorrhea.

Follen Cabot, Medical Record, December 20.

The instructions given by the author are very good, and intended to benefit the patient, as well as prevent infection of the innocent. The only trouble is, that the patients so infected are too careless, and will not carry out the instructions. We recollect one patient, having gonorrhea, was advised to avoid sexual excitement, and not getting better, on being interrogated, answered he had no sexual intercourse, but every evening went to see his girl and they only played with each other. Patients with venereal diseases cannot be depended on, and, in most cases, even will not use the injections correctly.

The Evolution of Urology. Ramon Guiteras. An opening address, delivered by the president at the annual meeting of the American Urological Association, June 13, 1902. This is a historical sketch well worth perusing, an excellent article, which proves the ability of its author. It runs over the history of Urology from ancient to present times, mentions all modern auxiliaries and recent inventions. It contains principally the following subdivisions: 1. The discovery of anæsthesia. 2. The discovery of pathogenic germs. 3. The perfection of urinary analysis. 4. The possibility of illumination of the urethra and bladder. 5. The perfection of urethral catheterism. 6. The introduction of the Roentgen rays. 7. Anti-sepsis and asepsis. 8. Advanced therapeutics and improved operative technique. 9. Strictures. 10. Prostatic operation. 11. Stone in the bladder. 12. Operations on the kidneys.

We would recommend the addition of recent inventions for the examination of the ureters by B. Lewis, and particularly a new cystoscope for the simultaneous catheterization of both ureters by Frederic Bierhoff of New York City. About the treatment of urethral strictures, the reporter disagrees naturally with the author of the address.

R. N.

EYE, EAR, NOSE, AND THROAT.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.,

Scarlatina Perforations of the Pillars of the Fauces.

The particular subject to be considered is that kind of scarlatinal sore throat, usually designated streptococcal angina, characterized by superficial or deep tissue destruction or even circumscribed gangrene (Thomas Hubbard, Toledo, Ohio, Laryngoscope, October, 1902.) The expression, coagulation necrosis, applicable to all pseudo-membranous processes, implies a more or less superficial septic thrombosis involving all blood channels. In deep penetrating ulceration or circumscribed gangrene there is septic thrombosis of the larger veins primarily, in fact the depth of the slough is determined by the penetration of septic coagulation in the veins of part. This conception of the deep coagulation necrosis characteristic of scarlatinal angina is important. The fulminating progressing septic phlebitis involving the large venous trunks.

Special text-books and syphilographers do not give proper credit or rather discredit to scarlatinal angina as a cause of defects and cicatrices in the faucial pillars.

A deep focus of streptococcal infection, tonsillar or subtonsillar, causing necrosis of all contiguous tissue rather than pus accumulation as in ordinary peritonsillitis, is the cause of perforation of anterior and posterior faucial pillars. The pharyngo-maxillary space is the probable location of this focus of necrosis.

Scarlatinal ulceration is usually bilateral, and being often very insidious and marked by other severe systemic symptoms, the lesion is very frequently overlooked.

The treatment of scarlatinal angina must be conducted with extreme surgical thoroughness and patient persistence. Bilateral destructive otitis is a common complication of scarlatinal angina, since the dysphagia caused by throat infiltration allows regurgitation of fluids and infecting material into the naso-pharyngeal space and only by prompt healing of the throat can the hearing be saved.

Primary Epithelioma of the Uvula.

In the treatment of this case, which is reported by Dr. James F. McCaw (Annals of Otology, Rhinology, and Laryngology, August, 1902), the screen of block tin with a cylinder of the same material served to direct the X-ray upon the desired part. The diseased surface had healed very satisfactorily under the treatment, the chief feature of the healing process being the comparative freedom from cicatricial tissue, and slight degree of contraction.

In the discussion of this case before the American Laryngological, Rhinological and Otological Society, Dr. C. B. Coakley said that he had used the X-ray in a case of epithelioma of the superior maxilla, supposed to be of about three weeks' duration. The man refused surgical operation, and was treated by the X-ray for a week by Dr. William James Morton with some improvement. The patient then went away for a short time on business, and on his return the disease was found to have advanced very considerably.

The case was further discussed by Dr. Otto J. Stein, of Chicago, who referred to a case of leukoplakia of the soft palate and mouth that he had treated for about three months by the usual method without benefit. Last December the X-ray treatment of the case had been begun by Dr. Pusey, and after two months he had reported the case as a failure. After another period of two months the result was still negative. In Dr. Macaw's case it seemed difficult to determine how much of the good result was due to the surgical measures and how much to the X-ray.

Local Pathology of Acute General Infection Arising Through the Lymphoid Tissue of the Fauces.

As far as our information now extends, acute infectious bacteria multiply in the tonsillar tissue proper only when a penetration has been effected into the germ centers of the follicles. (J. L. Goodale, Boston Medical and Surgical Journal, September 25, 1902). Under certain circumstances, this invasion is brought about, and the termination of the case then depends upon the course of the abscess. If these abscesses discharge externally through the crypts, recovery occurs without complication. If they rupture into the efferent lymph channels, a circumtonsillar abscess may ensue. Our anatomical knowledge, and the results of Pirera's experiments lead us to assume with reasonable possibility that these microorganisms may be carried beyond the capsule of the tonsil into the adjacent lymph glands, producing there acute proliferative or suppurative inflammation. If the intrafollicular abscesses should discharge into the veins of the vicinity, the conditions present would be adequate for the production of a general septicemic infection. The presence of such intrafollicular abscesses can at times be recognized clinically by the occurrence of pinhead-sized white spots, lying below the mucous membrane of the free surface of the tonsil.

Epithelioma of the Lower Eyelid Treated with Chlorate of Potash.

At the September meeting of the Orleans Parish Medical Society, Dr. E. W. Jones, of New Orleans, presented a case of epithelioma of the lower eyelid, which was much improved

by means of the local treatment of chlorate of potash. The chlorate was placed in a small muslin bag and strapped over the lid with adhesive plaster. With the X-ray treatment there had been no improvement, on the contrary, it seemed to stimulate the growth. Whereas, with the chlorate of potash, there was a marked improvement. Another case treated in this way had been entirely cured.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Roentgen Ray and Ultraviolet Light in the Treatment of Malignant Diseases of the Uterus, with Report of an Inoperable Case. By Margaret A. Cleaves, M. D., Medical Record of December 13, 1902.

To the writer's mind, the work already done with the X-ray, in the treatment of cancer of the superficial tissues, epitheliomas, sarcomas and carcinomas, is of such character as to cause it to be regarded as more than a promise of some usefulness, although the fact is recognized that experience with it is necessary, in view of the almost universal recurrence of this disease.

Johnson and Merrell, in August, 1902, presented a resumé of their work, extending over a period of two years. Twelve cures of epithelioma, sarcoma, and lupus are reported. In these cases from one month to two years had elapsed since the last exposure.

The following case is reported to show what has been accomplished in a case of inoperable cancer of the cervix uteri and adjacent tissues, by means of the X-ray and chemical rays of light, and in order to encourage its further use in similar cases.

Physical Examination. Inspection.—Medium height, weight 104 pounds, face drawn, haggard, marked cachexia, skin, pale yellowish cast, dry to touch. Conjunctiva and all mucous membranes pale. Tongue coated, breath foul.

The labial mucous membrane was very pale, vaginal introitus constricted, digital examination difficult because of pain consequent upon narrowing of the canal, both from loss of normal elasticity, and by reason of the presence of the friable tissue extending into vaginal fornices, especially in left. Cervix one mass of cauliflower excrescence, which crumbled off at touch and bled profusely; both broad ligaments infiltrated, left more marked than right. Uterus somewhat enlarged and immobile because of pelvic infiltration. Characteristic dirty and ill-smelling discharge. Vaginal mucous membrane

in posterior cul-de-sac sloughing off, and vaginal folds or rugæ showing ragged ulcerated edges, the whole bathed in the characteristic dirty discharge, of overpowering odor. Perforation seemed imminent. Speculum examination was attempted, but was not successful, owing to the rigidity of the parts and encroachment by infiltration upon the vaginal canal. Attempt was followed by severe pain and bleeding. Heart's action normal, but weak. Circulation poor. Urine not examined.

The patient was very feeble, unable to sit up but a few minutes at a time, and able to walk only a short distance, *i. e.* across the street from her boarding-house to writer's office. Obligated to lie down and rest after the slightest exertion. Appetite poor, liver and bowels sluggish, hemorrhoidal veins much enlarged, at times bleeding. She was also very nervous and much depressed. Hemorrhagic discharge every few days, at times excessive. Pain constant through pelvis and down inside of legs.

On the day following the above examination, May 15, and before instituting treatment the writer called upon Dr. H. C. Coe, to see and examine the patient for the purpose of securing a surgical opinion before underaking the treatment of the case. His findings were involvement of the cervix uteri, infiltration of anterior and posterior vaginal walls, also of broad ligaments, with diagnosis of an inoperable cervical cancer. He said he would not operate upon such a case and that he did not know a surgeon who would. Treatment was initiated May 15, 1902, by means of a vaginal hydro-electric douche, temperature 100° F., four quarts medicated with 10 grains bichloride of mercury and used at the positive terminal of a source of continuous electromotive force, indifferent contact, fifty square inches in area, to the abdomen, with 40 ma. of current. This was followed by the use of a general application of the convective discharge of the Franklinic current, for the purpose of initiating nutritive changes.

The patient was first rayed on May 21 through an ordinary bivalve speculum; exposures ten minutes; after the fourth exposure hemorrhage was temporarily arrested, disappeared, and pain was relieved, with other indications of improvement. On August 12 the original Caldwell tube made for throat work was secured and the rays were applied in close proximity to the lesions. The improvement was remarkable; nutritional gain steady and at no time has there been a return of the odor.

The patient had been under care five months and one week, during which time 110 treatments have been given. For the first two and one-half months daily, Sundays excepted, and then three times a week; of these, fifty have been with the X-ray and fifty of local light application. The X-ray applica-

tions have not been made at regular intervals, but according to the conditions of reaction—thrice, twice, and once a week. Irradiation has been supplemented by intravaginal applications of the chemical rays of light, both at the same sitting, and in the intervals between the X-ray séances. The general light bath has been used during the menstrual function, as well as in initiating the treatment, not only to secure the action of the chemical rays, but to bring the organism under the influence of the entire radiant energy of the arc, and permit the inhalations of ozone as well. In this way the entire body has been exposed to all the radiant energies from sources of 4,000 total nominal candle-power (the arcs of 2,000 candle-power each), and the tissues of the patient's body kept under the influence of the light vibrations at a time when the local treatment was prohibited by reason of the physiological function. In three instances the X-ray was also used through the abdomen during menstruation. In an experience extending over a period of ten years, with the arc light, the writer had found it successful where other therapeutic measures, medicinal and physical, had failed in improving secondary anæmic conditions, and had treated successfully profound secondary anæmias, cases of pulmonary tuberculosis, as well as other conditions. The improvement secured in incurable pulmonary cases, and the recovery of the curable cases presenting themselves for treatment, as well as the prompt healing of a tubercular ulcer of the larynx, under influence of general applications of the arc light, led to its use in building up the general health of the case in question, and the utilization of the chemical rays to assist in combating the local lesion.

The only trouble has been in using the special tube devised by Mr. E. W. Caldwell for throat work. In this tube the anode becomes so hot that on three occasions a heat burn has been produced, which, however, has promptly healed without untoward effect. This action was at first attributed by the writer to the metal speculum or shield provided with the tube. It was therefore discarded as unsuitable. Similar burns have been produced twice since, however, showing that they were due to the heating of the anode. For the last week a Tesla tuba has been used. As it is only provided with a cathode, the patient serving as anode, there is no danger of undue heating effects.

Exposures were made with the ordinary tube, at a distance from six to ten inches from the target, and for from five to ten minutes. With the Caldwell and the Tesla tube the applications have been from one to five minutes, with an average of three minutes. With these tubes there has been no effort to protect the vaginal tract, and all the tissues from the introitus to the cervix and vaginal vault have been brought

directly under the influence of the X-ray vibrations, while the penetration, especially with the modified Caldwell tube, must profoundly influence all the pelvic tissues.

The writer prefers to use the Caldwell tube without a Ferguson's speculum, so as to secure the action not only on the cervix, but upon the entire vaginal tract, especially in the fornices and cul-de-sac.

The heating of the anode has, as has been pointed out, caused slight heat burns, but the tube is now being constructed so as to permit of its use without burning and without using a speculum, a detailed description of which, by Caldwell, was shown in this Journal for December.

The Tesla tube should preferably have a long, well-insulated handle of hard rubber, to cover the tube as a shield to the introitus. This, for two reasons: (1) To prevent the operator from being exposed to the action of the ray, and (2) The high-frequency discharge. The X-ray energy is much less with the Tesla tube now in use than with the Caldwell. The vacuum tube electrodes, which the writer has in daily use for percutaneous, intra-aural, nasal, vaginal, rectal, urethral, and intrauterine applications, when connected with a multiple spark-gap, give not only the characteristic vacuum-tube discharge, but a true X-ray effect as well, demonstrable with the fluoroscope. A localization of the X-ray energy within the cervix to just beyond the internal os is in this way possible.

The best results cannot, in the writer's opinion, be secured without direct intravaginal and uterine localization. The chemically-disorganizing action of the X-rays in the tissues of the human body, assuming that the chemical substances encountered have equal stability, should diminish with the depth, partly by reason of the increased distance from the radiant source, or anticathode, and partly by reason of increased absorption and attenuation at each successive layer of traversed tissue. Hence, the nearer the seat of the lesion the X-ray energy is expended, the better the result.

Discussion.

Dr. H. C. Coe said he had examined the patient very carefully before the treatment was begun, and there could be no question that the case would have been looked upon by surgeons generally as inoperable. He would not have attempted to use even the sharp spoon and curette. He had examined this patient again only yesterday, and the appearance was that of a woman shortly after hysterectomy. No nodules could be felt at all on the right side; on the left side was an extensive cicatrix, the result of the malignant process. It had drawn the uterus over to one side of the pelvis. There

was no longer any foul discharge. The appearance of the patient indicated a remarkable improvement, and he could not imagine that the same result could have been attained by any of the recognized surgical methods, not even the use of the galvano-cautery as employed so successfully by the late Dr. John Byrne. Personally he had not had a single case of malignant disease that he could consider cured; the disease had recurred in some cases six years or more after the operation.

The X-ray in the Treatment of Intra-Abdominal and Other Deeply-Located Malignant Growths. By Dr. Clarence E. Skinner, of New Haven, Conn. Read at the Annual Meeting of the American Roentgen Ray Society at Chicago, December, 1902.

He considers the curative action of X-light to be due to some inherent corrective power, probably vibratory in nature, which is exerted upon the developmental processes of the aberrant cell elements, and not to ozone formation, electrification, or electrolysis in the diseased tissue. In other words it is a *specific* influence of X-light.

He reported a series of thirty-eight cases of deeply-located cancer, which are divided for convenience of consideration into five groups, as follows: first, thirteen cases involving various deeply-seated localities and which had reached a fatal termination; second, four cases involving bony tissue; third, ten intra-abdominal cases still under treatment; fourth, a series of ten mammary cancers; and fifth, one sarcoma of the neck.

The clinical data of the whole thirty-eight cases are stated as follows: three have apparently entirely recovered, seventeen have been continuously benefited and are still improving, with good prospects of ultimate recovery, thirteen were temporarily benefited, two experienced no benefit whatever, and three discontinued the treatment before enough applications had been made to indicate whether or not any results would have followed.

Attention is called to the fact that in estimating the absolute value of these results it should be borne in mind that every individual one of these cases was inoperable because of the advanced stage of the disease and offered a hopeless prognosis both as to arrest of the malignant process or the attainment of euthanasia, under any other method of management.

The clinical results obtained in these cases lead him to conclude that the pain in a large majority of cases of deeply-seated cancerous degeneration is removable by X-light to an extent ranging from slight amelioration to entire disappearance; that the ray is capable of exerting a sufficiently profound influence upon many cases of deeply-seated cancer to marked-

ly retard their further progress and sometimes to produce ultimate cure; and that a certain proportion of deeply-seated malignant growths exhibit absolutely no evidence that they are influenced in the least, owing probably to some individual constitutional idiosyncrasy on the part of the patient.

The four hypotheses that have been advanced as explanatory of the action of the X-ray in cancer are discussed at length.

Dr. Skinner is of the opinion that the X-ray will not do away entirely with the use of the knife but that in many cases both agents can be advantageously employed. Prominent reasons for this are that the less tissue there is intervening between the source of the light and the malignant growth the greater will be the power with which the agent will act, and because, as it will be easier for the restorative influence to reclaim cells on the border line between healthy and diseased tissues which have only just begun to exhibit degenerative tendencies, than those in which the aberration has become firmly established, it is well to eliminate as much cancerous tissue from the problem as possible. As there will be less tissue to break down there will also be less danger from sepsis.

In some growths extensions have been arrested, but the original tumor mass remained, although quiescent, and sometimes reduced in size. The speaker gave it as his opinion that such residuary tissue should be removed by the knife, as even though shorn of its malignant tendencies for a time, it might be capable of producing dangerous irritation in the future by acting as a foreign body.

He considers that the ray should always be applied after operation for malignant growths, and in some cases before operation as well. Cases of mammary cancers are cited as having been entirely cured by the X-ray alone, and this is considered to justify the use of the ray without the knife as long as the tumor improves.

As indicating that X-light sometimes exercises a powerful influence upon the nutritive functions he cites a case of his own, mammary cancer, where the breast was removed and the ray applied immediately afterward. In a few days the flaps took on an appearance like developing gangrene which disappeared in five days, however, after cessation of the X-ray treatments. In this case the healing process required twice as long as usual and absorption of the clots under the flap was sluggish in nature.

He also referred to a case in the practice of Dr. M. M. Johnson, of Hartford, where the breast had been rayed first and amputated afterward, in which the blood following incision merely flowed from the arteries instead of spurting as is usually the case, evidencing a marked diminution in the normal volume of the circulation.

Proper apparatus and technique are considered to be of prime importance. He prefers the twelve and sixteen plate revolving static machine for the treatment of deeply-seated growths, as exposures of fifteen minutes to rays from this apparatus are equivalent to exposures of ten minutes to those excited by a coil as far as liability to dermatitis is concerned, whereby it is possible to give treatments one-third longer with the static machine. This factor assumes importance inasmuch as the beneficial influence is considered to be proportionate to the length of time during which the vibrations are allowed to affect the growth rather than the *volume* of the light. It is the greater volume of the light emanating from the coil-excited tube that produces the greater liability to dermatitis.

Dr. Skinner prefers the German type of tubes for use with deeply-seated cancers. He has them made without any chemical for regulating the vacuum, and when they refuse to glow from use, he bakes them at a temperature of 350 F. from thirty minutes to several hours, according to the idiosyncrasy of the individual tube.

Exposures of fifteen minutes to rays from a tube excited by a static machine, with the anode ten inches from the patient's skin, are recommended twice weekly for the first two weeks or until the personal equation, as regards susceptibility to dermatitis, of the patient is ascertained, after which the distance from the skin may be lessened if it should be considered desirable.

In treating uterine cancers he places the patient in the lithotomy position and rays through the perineum at one séance, and at the next lays the patient flat upon her back and rays through the abdomen above the pubis. By thus alternating the areas of skin through which the rays are passed, treatments can be applied twice as often without provoking dermatitis. He does not use a speculum because "A vagina susceptible of distention sufficient to bring the whole of the diseased tissues within the field of application is a rare phenomenon. The peripheral portion of the growth where the process is spreading is that which it is most important to bring under the influence of the rays, and that is the very portion which the speculum fails to expose." Future possibilities for the Pennington Shield and the Caldwell X-ray tube are suggested, but enough experience has not been amassed to make their usefulness apparent and positive.

The paper concludes as follows: "I wish to state most emphatically that the therapeutic application of the ray should be intrusted, at the present time, only to the hands of operators who are skilled and experienced in this particular line of work, where it is possible to secure such, as the difference between efficient and faulty technique will frequently con-

stitute the difference between success and failure in clinical results, as well as between safety and danger to the patient."

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

Tissue Changes Induced by the X-ray.

A paper giving the results of investigations concerning these changes was read by Dr. A. G. Ellis. Four cases were reported, in three of which microscopical studies were made both before and after exposures to the X-ray. The most interesting changes were noted in a scirrhus carcinoma of the breast, a portion of which had been given eight 10-minute exposures at intervals of two days, the remainder being covered by a lead shield. Softening of the exposed portion was noted after the fifth exposure. The entire breast was removed by operation and two portions studied. The softening was found to be due to a cavity 1.5 by 1 cm. in dimensions, this containing a fluid showing many large cells, the protoplasm of which was almost entirely filled by fat granules. Surrounding the cavity were necrotic portions of the tumor, the epithelial cells being granular and broken with destroyed outline and fragmented or entirely degenerated nuclei. The same degeneration in varying degrees was noted in the other cases, two squamous epitheliomas and an endothelioma. But little change was noted in one of the epitheliomas which contained a very large number of "pearls." A summary of the cases showed: (1) Necrosis of cells and trabeculæ of varying degree; (2) increase of elastic tissue in the three cases examined both before and after exposure; (3) a tendency to occlusion of vessels by deposits on their inner surfaces. This was marked in some instances, slight in others; (4) practically entire absence of infiltration by polymorphonuclear leucocytes. In regard to the claim of Beck and others that the changes in X-rayed tissue are due to obliterative changes in blood vessels, the statement was made that while these changes probably occur they are not in proportion to the necrosis. This suggests the probability of their being results of the same influence instead of cause and effect. The presence of immense numbers of cocci and bacilli in one of the cases after 20 exposures would argue against the bactericidal power of the X-ray. Unsatisfactory clinical results and slight microscopic changes in the epithelioma containing numerous "pearls" emphasizes the importance of cutting or curetting away diseased tissue whenever possible before X-ray treatment is begun. Med. News, November 22, 1902.

New Method of Abdominal Radioscopy. By M. Destol of Lyons, d'Electricité Médicale.

This method consists of making insufflations into the stomach by means of the tube of Fauche. By this means the



SKIAGRAPH BY M. K. KASSABIAN.

History.—Apparatus, 15-inch coil; mechanical interrupter (700 per minute); tube very high vacuum (resistance of parallel spark-gap, $8\frac{1}{2}$ inches); distance from plate, 15 inches; exposure, $1\frac{1}{2}$ seconds; developer, metol and hydroconone.

stomach can be seen to unfold itself if it is healthy, whereas, on the contrary, if a lesion affects the elasticity of its walls,

the unplaiting and the form of the insufflated organ are modified. Thanks to this insufflation, the author has been able to make the differential diagnosis between different tumors, such as tumors of the spleen, of the inferior side of the



SKIAGRAPH BY M. K. KASSABIAN.

History.—Apparatus, 15-inch coil; mechanical interrupter (700 per minute); tube, very high vacuum (resistance of parallel spark-gap, $8\frac{1}{4}$ inches); distance from plate, 15 inches; exposure, 15 seconds; developer, metol and hydroconone. liver, etc. Once even the tumor of the transverse colon, which was composed of a large number of cherry stones, was seen, thanks to this process.

When the stomach is fully insufflated the point of the heart forces itself to the level with the vault of the clearly observed region. In a normal state this point is distinctly observed, beating, while in the pericardium a much darker spot is seen in its place, associated by throbbings scarcely or not at all perceptible. In two cases of pericarditis in which the diagnosis had been made by the preceding method, operative intervention confirmed the diagnosis. Moreover, this process enables the surgeons to direct the trochar into the pericardial effusion, which can thus be emptied.

At last, the stomach only supporting with difficulty this over-distention, the rejection of gas proves the elasticity of the organ, and provokes a sort of massage, which it would, perhaps, be possible to utilize as being more rational than the abdominal massages.

Radiography, X-Ray Treatment, the High-Frequency Method and Light Treatment. By Dr. Freund, British Medical Journal, October 25.

All radiant phenomena have the same physical basis; one class of ethereal vibrations gradually passes into another of different wave length, with no sharp boundary between. The rays possess chemical, fluorescent, and electrical properties. Their effects range from mere stimulation to actual destruction of tissue. In weak doses they favor organic processes, *e. g.*, growth of hair, while in stronger doses they lower vitality or produce inflammation or actual necrosis. Radiant heat, light, electricity, and X-rays all influence cell life similarly. The physiological effects are in direct proportion to the intensity of the raying, but in inverse proportion to the wave lengths. The reactions appear after a latent interval, the length of which is also inversely proportional to the wave lengths and intensity of the raying. Those rays which have the property of exciting fluorescence are also physiologically the most powerful. D'Arsonvalization can be included in radiotherapy, its effects being solely due to the spark discharges. These spark discharges cause physiological effects by (a) the mechanical bombardment of the tissues, (b) the production of heat, (c) chemical effects—formation of ozone, and (d) ultra-violet ray formation.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

It is an interesting fact that Strasser, clinical assistant of Professor Winternitz of Vienna, made the interesting observation and later confirmed it by an extensive series of experi-

ments, published in 1896 that general and prolonged application of heat or hot baths increased the acidity of the blood which was due to the presence of double the normal quantity of acid phosphate circulating in the blood, while at the same time, the nitrogen elimination was much increased. His investigations upon the action of the cold bath of low temperature and short duration and mechanical activity (douches) showed a marked increase in the elimination of urea, uric acid, ammonia, earthy phosphates, xanthine bases, alloxuric bases, extractives, and total nitrogen elimination. Cold baths stimulate all processes of tissue change by heightening the activity of the cell and produce inter-cellular exchange. Thus, heat sufficient for the induction of mild or even profuse perspiration followed by the active short and stimulating cold bath is unquestionably the most powerful therapeutic weapon at the command of the physician for the elimination of the waste products of tissue metamorphosis, by these actively circulating in the blood or stored in the fibrous or other tissues of the economy. It has always seemed to the editor of this department that Professor Haig has never given to hydrotherapy the prominence that should be accorded to it, as it is the weapon par excellence for the combatting of this condition. Mechanical vibration, and the so-called electric massage and stimulation, have a tendency in the same direction and can be used to supplement and aid hydrotherapeutic procedures, especially where local, as well as general effects, are to be obtained. That is to say, general eliminating and curative effects by the use of hydrotherapy supplemented by local effects through the use of massage, vibration, and electricity. In a very interesting article published in the Medical Record Professor Haig dwells upon his discoveries in uric acid and advances some new and interesting data relative to this toxin.

Haig says gout is a constitutional disease due to any defect in the formation or functioning of the body. It is a form of diet disease due to food poison. Gout is rheumatism and rheumatism is gout and the arthritis of both is due to the irritation produced by uric acid. The cause of uric acid diseases he attributes to the introduction of uric acid and says: "In other words, all the uric acid of formation does no harm provided that a large amount of introduction is not added to it. Two essential points therefore arise with regard to uric

acid; (1) introduce as little as possible; (2) take no more than a physiological allowance of albumen." The most important factor is that of introduction and with this in view it becomes necessary to avoid the muscles and viscera of animals, tea, coffee, cocoa, for they contain large quantities of uric acid and the xanthins. Uric acid acts in two ways: (1) local irritation in joints and fibrous tissues, (2) general symptoms often called gout in the blood with high blood pressure, etc. It is a fact and constantly reiterated by Haig, and which the writer has amply confirmed by his own studies, that lithia relieves the pain and discomfort of chronic arthritis, but it does so not by eliminating the uric acid, but by diminishing it and driving it into the tissues—in fact, doing injury instead of good. The most powerful solvents are the salicylates, not because they get the urates into solution, but because they remove them from the irritated points and from the body, for urates in solution are irritating, but deposited are not. The well-known law of selection of the fibrous tissue is due to its lessened vascularity and diminished alkaline blood supply; thus rendering them peculiarly sensitive to the influence of cold, wet, or acids (such as wine or beer.)

Haig states: "Lastly these changes in the quantity of uric acid in the blood and the alterations in the rate and completeness of the capillary circulation affect the quality of the blood itself, and thus uric acid is the cause of all the commoner forms of anæmia. Thus the blood decimal is found not only to vary up and down from morning to evening, but by means of drugs on the one hand or feeding uric acid on the other, it also can be made almost anything we like.

Prevention follows so simply, from the above considerations, that it need not detain us. It consists in removing from the diet of the young all substances which contain a noticeable quantity of uric acid. Treatment resolves itself into two lines: To cut off the poisons that have been the cause of the trouble, so that introduction shall as far as possible cease, and second to provide for the elimination of the poisons already in the body.

Hydrotherapeutic Treatment of Typhoid Fever.—Dr. Henry B. Favill spoke on this subject. The statistics in favor of the bath treatment were favorable as compared with other forms

of treatment. He referred to the typical, original Brand bath, which he defined as the vigorous rubbing and manipulation of the typhoid patient, well immersed in water of a temperature varying from 60 deg. to 80 deg. F. The manipulation of the bath is an essential part of the process; the temperature is subject to variation. Although the antipyretic value of the bath is important, he considers it a mistake to centralize attention upon its antipyretic effects. Its effect upon the patient is sedative and tonic. A patient who is subjected to an intelligent administration of a cold bath in typhoid fever, typically and regularly, shows marked sedative effects, as manifested, first, by a feeling of comfort, as against a previous feeling of malaise; second, as manifested by a tendency to sleep, as contrasted with previous restlessness and inability to sleep. The second phase of the bath was its tonic effect, as manifested by an improvement in the cerebral condition, a condition of clearness of mind as against hebetude; of alertness as against indifference; of comfort, physical and psychical, as against distress. As to the digestive tract, there was typically a better digestion, as evidenced by the decidedly less typhoid character of the tongue, and by a less tendency to meteorism. He described a modification of the Brand method for use in hospitals and in private practice. *Medical News*, October 18, 1902.

Note on the Administration of Water in Disease.—By G. Frank Lydston, M. D., *Medical News*, August 9, 1902.

Since the advent of the various theories of uric acid pathology and the recognition of the value of ingestion of large quantities of water in the treatment of the various conditions in which the poisonous products of tissue metabolism are supposed to be the *fons et origo mali*, this simple method of treatment has often been carried to extremes.

1. While the ingestion of large quantities of water in various affections is often of great value, the treatment is sometimes extremely detrimental.

2. The nutritive value of the blood is often impaired by the relative hydremia produced by the ingestion of large quantities of water.

3. Disturbances of the circulatory and nervous systems are frequently produced by it. So-called weak heart, palpitation, nervous irritability, lassitude and exhaustion on slight exertion are among the phenomena that may result.

4. Serious digestive disturbance, involving impairment of the secretion and composition of the gastrointestinal juices, and gastromotor insufficiency may be produced by the ingestion of water in larger quantities.

5. Edema and anasarca, while often relieved by the free

ingestion of water under favorable circumstances, are not infrequently enhanced by it.

6. Renal water habit may develop, by virtue of which the kidney becomes permanently sluggish unless it receives its wonted stimulus of large quantities of water.

7. Acute and chronic inflammatory affections of the kidney are sometimes aggravated by giving water in excess simply by overworking the renal organs.

8. Inflammatory affections of the lower portions of the genito-urinary tract are often deleteriously affected by excessive water-drinking, through mechanical disturbance necessitated by the resultant frequent and copious micturition.

THERMOTHERAPY.

EDITED BY CLARENCE EDWARD SKINNER, M. D., LL. D.

The Therapeutic Value of Heat and Cold Applied to the Spinal Column. W. Frank Glenn, M. D., Nashville Journal of Medicine and Surgery, November, 1902.

The author believes that varying conditions of the circulation in the spinal cord, viz.; different degrees of hyperæmia principally, and anæmia, occasionally, are responsible for the development of diseases; that in all diseases the circulation is disturbed, and that if no circulatory disturbance existed there would be no disease. In conditions characterized by general fever, the blood circulates in excess in the capillary areas, with a corresponding anæmia of the cord, and in chronic disease characterized by coldness of the extremities the capillary areas are anæmic and the cord hyperæmic.

He says: "It is a fact, which can be readily demonstrated, that ice applied properly to the spinal cord causes the blood to flow to the periphery and produces a pleasant glow in the skin all over the body. It is also known, and can be demonstrated, that heat applied properly to the spinal cord lessens the blood in the peripheral vessels and produces a cooling of the surface. Recognizing these facts, we can easily understand that if we have an acute inflammation of any organ—for example, the lungs—with increased amount of blood in their capillaries and a general elevation of temperature—the application of heat by means of the hot water bag over the spinal centers controlling the circulation of the lungs will of necessity lessen the quantity of blood in them and relax the distended capillaries, causing a free exudation from them, and at once start the patient on the road to rapid recovery without a dose of medicine; also, if we have any disease in which the amount of blood in the given part is less than nor-

mal, the application of ice to the spinal cord at the proper place and in the proper manner will cause the flow of blood to the capillaries and an immediate resumption of the normal physiological circulation and thereby banish the existing disease."

Among the conditions which he has succeeded in benefiting by the application of these principles are, suppressed menstruation, uterine hemorrhage, congestion of the lungs, and chronically cold hands and feet.

Considerable stress is very properly laid upon applying the measures intelligently. "To say, 'Apply ice or hot water to the spinal cord,' seems simple and easy; but I can assure you that if it is applied in a haphazard or unscientific way it will do no good, and may do serious mischief. I can also assure you that to get the absolutely wonderful effects of heat and cold, one must be thoroughly posted in the anatomy and physiology of the nervous system; and to apply the heat and cold over the proper portions of the cord requires as much scientific precision as, if not more than, to prescribe a dose of medicine. To influence the circulation in the head and throat, the application should be made from the fourth cervical to the fourth dorsal; in the respiratory organs, from the fourth cervical to the sixth dorsal vertebra; in the gastrohepatic region, from the fourth to the ninth dorsal; in the renal region, from the ninth to the twelfth dorsal; in the intestinal region, from the ninth dorsal to the second lumbar; in the genital region, from the eleventh dorsal to the fourth lumbar."

The writer concludes by summarizing as follows; "(1) Nothing should ever be put into the stomach except such substances as form a component structure of the body; (2) if this rule were rigidly adhered to, there should be no digestive disturbances and we should always have a normal blood; (3) since the blood is the life, when the blood has its structural element normal and every cell is receiving its proper supply—no more, no less—disease cannot exist; (4) since we know that the amount of blood in any part is controlled by the action of the vasomotor centers of the spinal cord, and the sympathetic ganglia in close proximity to the cord, when these centers are performing their functions properly, the blood circulation must be normal and no disease can exist; (5) when there exists any disease causing an increase of blood in the capillaries of an organ, the application of heat over the vasomotor centers presiding over that organ causes almost at once a normal flow of blood in them, and, consequently, a normal circulation in the organ affected; (6) when there exists any disease which lessens the normal amount of blood in any organ, then the application of ice over the vasomotor centers presiding over that organ will cause a normal amount

of blood to flow to that organ, resulting at once in a normal circulation and a consequent subsidence of the disease."

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

Psychiatry.—By Robert MacDougall, M. D., Ph. D., New York. Abstracted from Boston Medical and Surgical Journal.

One group of suggested hallucinations has received at the hands of the Nancy School the name of "negative hallucinations." The subject is told by the hypnotizer that he shall not see or hear a certain person or thing actually before him, and immediately the presence of the prohibited object is effaced from his mind. He neither sees nor hears of it. If it be a person he completely ignores his presence. If spoken to by him no reply is given; if touched or pricked, the contact is either not felt, or if felt is referred to some other source. The presence of the forbidden thing is resolutely and systematically overlooked. In these negative hallucinations the change is only apparently peripheral. There is no anesthesia of the end organs, no paralysis of the nerves of sense. Toward all other objects the senses act normally: the eyes see, the ears hear, the hands touch every object, but the one thing, or system of things, effaced by the suggestion of the hypnotizer. It is as if in this state the mental furniture consisted of two systems of associated ideas, whose members are mutually assistive among themselves, but repulsive towards each other. In the normal state these two streams are parts of a unitary process the elements of which are bound together by intimate cross-references, so that there takes place among them a constant interaction and readjustment. An excitement aroused in any one part of the system tends to radiate into all connected centers; the fortune of any suggested idea therefore depends upon the relations of the supporting and inhibiting systems aroused. In the hypnotic trance it is as if this unitary system had been broken up by the closing of certain paths of connection, and two isolated groups established. An excitement aroused in either system now extends as before to the surrounding centers of that system, but fails to pass over to the other. Cross-references no longer exist; the idea arouses only consonant ideas.

While the foregoing abstract refers to what takes place during formal hypnosis, it also possesses special value and has pertinency in connection with psychic suggestion made in the waking state. The physician, for example, will find that he can secure better results by impressing upon his patient's

mind (especially if he is temperamentally neurotic) what will *not* happen as the result of the treatment he is administering, than by positive affirmations. In other words, tell him, for instance, that the pains of sciatica on pleurodynia will not recur so quickly or with as great intensity after as before treatment. Impress upon his mind the *nots* rather than the *wills*. It will be found in practice to be decidedly more efficacious. This is a simple experiment easily made when administering any form of treatment. Thoroughly tried, the results are almost certain to be of such a satisfactory character as to make this a part of the regular routine of treatment thereafter. It will effectively control the "pain habit" a psychologic complication of many acute and chronic diseases—and the physical treatment (electric or otherwise) will the more quickly control and dispose of what remains. Few diseases, acute or chronic (especially the latter), regardless of the quality of their gravity, will be encountered in which there is not more or less of this psycho-physical element actively operative which, uncontrolled, impedes the progress of purely physical remedial agents. Whether recognized or not, it is usually present, and requires for its removal an adjunctive treatment that may properly be called "extra-physical."

M. F. P.

BOOK REVIEWS.

THERAPEUTICS OF DRY HOT AIR. By CLARENCE EDWARD SKINNER, M.D., LL. D., Professor of Thermo-therapy in the New York School of Physical Therapeutics; Physician-in-charge of the Newhope Hot Air Sanitarium, New Haven, Conn.; Member of the American Medical Association, American Electro-Therapeutic Association; Charter Member of the American Roentgen Ray Society; Member of the American Association for the Advancement of Science; Conn. Medical Society; New Haven County Medical Society; Yale Medical Alumni Association, etc. Published by A. L. Chaterton & Co., 156 Fifth Avenue, New York. Price \$2.00.

The volume contains two hundred pages and fifteen plates (twelve full-page) illustrating apparatus, methods of applying wrappings and treatment.

This valuable therapeutic method has been treated by the author with his characteristic thoroughness and conservatism. He mentions briefly other remedial measures which he considers it advantageous to associate with dry hot air, stating that it is not a "universal panacea."

The methods of application are clearly set forth, and indicate a degree of technical skill and knowledge of the treatment of many conditions which have defied the older methods.

The student of medicine, as taught in the medical schools at the present time, if he has received no other knowledge or experience, may fail to appreciate the writer's advanced method.

It is a volume which should be in the hands of every general practitioner, and one which no physician, who employs hot air as a therapeutic agent, can dispense with.

HOW TO SUCCEED IN THE PRACTICE OF MEDICINE. By JOSEPH McDANEL MATHEWS, M. D., LL. D., President of the American Medical Association, 1898-99. Author of "Mathews on Diseases of the Rectum"; ex-President of the Mississippi Valley Medical Association; Kentucky State Medical Society; American Proctological Society; Louisville Surgical Society; Louisville Clinical Society; President of Kentucky State Board of Health; Honorary Fellow American Association of Obstetrics and Gynecology; Professor of Surgery, Hospital Medical College; Late Professor of Surgery, Kentucky School of Medicine, etc. Published by John P. Morton & Co., Louisville, 1902.

This book should find its way to every physician in the land. The young man will read it with much profit, the older one with pleasure. It is so refreshing and true to life. Words of encouragement to those in need of it, instruction to the young and advice to the young and old, is found in abundance in its pages. To the author, the profession of medicine is like a rare jewel, something to be jealously guarded,—an ideal. But while such are his views, he emphasizes the fact that it is far better and more practical, hampered, as we are, by human fallibility, to idealize the real, instead of attempting forever to realize the ideal. He says:

"The medical profession is, or should be, a band of brothers, united by ties that should not be broken by trivial things. No class of men is assailed more, no class is so often persecuted, condemned often by public opinion without a trial, and censured by those who should be its warmest advocates. More is the reason that its members should stand steadfast, pursuing a course of rectitude that is above reproach, protecting those that need protection, and bidding defiance to every unjust accusation."

The volume abounds in so much that is true wisdom, born of many years of ripe experience, that one reviewing the book is much tempted to quote out of it profusely. "All the world is a stage and all the men and women merely players." "It is for the young doctor to play many parts, the old doctor 'turns again toward childish treble,' the young

doctor is seeking 'the bubble reputation.'" The author dedicates the book to his wife, and as the pages of the book are perused one finds out why he so dedicates it. His domestic happiness must be great, for high is his idea of women, in general, and the doctor's wife in particular. Blessed is he who can entertain so lofty opinions of his "life partner," and a blessing is it to a "life partner" to possess so noble a soul for a husband.

Particular attention is called to Chapter IX., it is so true to life. H. G.

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS. A Practical Exposition of the Methods, Other than Drug-Giving, Useful in the Prevention of Disease and in the Treatment of the Sick. Edited by SOLOMON SOLIS COHEN, A. M., M. D., at one time Professor of Medicine and Therapeutics in the Philadelphia Polyclinic; Lecturer in Clinical Medicine in the Jefferson Medical College; Physician to the Philadelphia Hospital and to the Rush Hospital for Consumption, etc. In eleven octavo volumes. American, English, German, and French Authors.

VOLUME V.—PROPHYLAXIS, PERSONAL HYGIENE, CIVIC HYGIENE, CARE OF THE SICK. By JOSEPH MCFARLAND, M. D., Professor of Pathology, Medico-Chirurgical College, Philadelphia; ALBERT ABRAMS, A. M., M. D., University of Heidelberg, formerly Professor of Pathology, Cooper Medical College, San Francisco, and W. WAYNE BABCOCK, M. D., Lecturer on Pathology and Bacteriology, Medico-Chirurgical College, Philadelphia. 536 pages illustrated. Published by P. Blackiston's Son & Co., 1012 Walnut St., Philadelphia, 1902. Price for the set complete, \$27.50, net.

This addition to this valuable and progressive system of therapeutics is an important acquisition to medical literature. It includes a discussion of prophylaxis, by Drs. McFarland and Babcock, in a concise and thoroughly practical manner. The writers in Part I., Section I., consider the intrinsic and extrinsic factors and causes of disease. Section II. treats of the diffusion of disease through air, water and soil, transmission through animals, parasites and social intercourse. Section III., under the headings Immunity, Artificial Defences, Asepsis, Antisepsis, Disinfection, and treats in an able manner the subject of Prevention. Section IV. includes the Prophylaxis of the Special Infections, Alimentary, Respiratory, Cutaneous, Circulatory, and Venereal. In Part II. Dr. Leffman devotes forty-three pages to Civic Hygiene. The department is skillfully treated and includes chapters on the City, Municipal Health, Organization, Food and Water Supply, and Disposal of Waste. The closing part includes Domestic and Personal Hygiene, Nursing and Care of the

Sick Room, by Dr. Abrams. As we would expect from that able scientific writer, it is one of the most valuable contributions to this popular system. The subject of Hygiene of Dwellings, Travel, School, and Personal Hygiene is considered. Hygiene of Special Periods, Hygiene of Dyatheses, are also practical chapters. Those on the Sick Room, Care of the Patient and Special Nursing, contain most valuable suggestions.

SOCIETY MEETING.

THE CLINICAL SOCIETY OF THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

Stated Meeting January 16, 1903. Clarence E. Skinner, M. D., Chairman.

ELECTROLYSIS AND ITS THERAPEUTICAL APPLICATIONS.

Dr. Robert Newman read a paper on the above subject. (Published elsewhere in this JOURNAL.)

Discussion.

Dr. J. A. Mitchell: I have listened with much pleasure and satisfaction to this paper because about seven years ago I looked upon Dr. Newman as my star in the world of electricity. I had the popular and vague idea that electricity was electricity, and nothing more, and that I could rig up some sort of a battery myself. The first question Dr. Newman asked me when I applied to him for advice was as to the state of my finances. He then advised me to buy a high tension coil to start with. This I did, and I have never regretted that purchase. Later on I consulted him again, and he then advised me to buy a complete cabinet, one containing a controller and a milliampere meter, with connections so arranged that the work would be as simple as possible. I owe Dr. Newman a debt of gratitude for his sound advice, for without it I should certainly have given up electricity long ago, just as many others have done. The great trouble is with most of those who essay to work in the field of electro-therapeutics, that they know nothing practically about electricity. For beginners in this field, therefore, I should advise a repetition of all the interesting experiments that have been performed

here this evening, and also experiments upon himself with the different kinds of electrical currents. To begin with, he should apply the bare metal electrode to some part of the body, and with the milliamperemeter in circuit, turn on a slight current—say three to five milliamperes for five minutes. Having noticed the effect of this, the electrodes should be covered with moist cotton, and the experiment repeated. Then the electrodes should be moistened with an alkaline solution and the experiment repeated. After this, using the same amperage, the current should be allowed to run for ten minutes. The next step should be to use ten milliamperes of current for ten minutes, the electrodes being changed to another position at the end of five minutes. This will give a good idea of the amount of congestion which takes place under the negative pole. It will be found that the redness under this pole will continue for two or three days, and the sensation for about twelve hours will be like that produced by the application of a mustard plaster.

When applying the galvanic current in the vagina, it must be remembered that the mucous membrane is bathed in an alkaline fluid and that the current passes very easily. A current of considerable strength may therefore be passed without the patient's experiencing any inconvenience, but after two or three hours it is probable that the patient will have to go to bed because of the great congestion that has been produced. When I first began using electricity I employed strong currents for only a very few minutes, and yet my patients had to go to bed because of the subsequent suffering. I became so discouraged with these results of my electrical treatment that I came very near giving up the use of electricity. I then found that if I used milder currents the results were much better, even though the treatment had to be kept up a little longer. Now I seldom use more than five, ten, or fifteen milliamperes of current in the vagina.

The effect of the faradic current is almost wholly mechanical. The high tension coil gives an antispasmodic effect—as for example, when there is a spasm of the cervix uteri. If sedation is desired, the high tension current should be used. If the object is to stimulate the muscular action, the primary current should be selected. Oftentimes the patient will say that little or nothing is felt, but we can gauge the strength and time of the application by our own experience in the use of electricity and our knowledge of the laws governing the passage of currents.

Dr. H. Grad: I was greatly interested in the demonstration given this evening, coming as it did from Dr. Newman, from whom we can all learn so much. I see great possibilities from the use of the galvanic current, although I have had no experience as yet in this field.

Dr. Pilgrim: Did I understand Dr. Newman to say that he secures absorption without destruction of tissue?

Dr. Newman: Yes, that is correct. As a rule, where a current of five milliamperes is used for a long time no cauterization is produced. I make it a rule never to destroy the mucous lining. If, however, I use the electric current in fibroid tumors or in carcinoma I employ stronger currents.

Dr. William Benham Snow: The subject of the evening is a most interesting one, and it has been presented in a most comprehensive manner. The differentiation of electrical currents and their selection with reference to their use in electro-therapeutics is a large and important subject. Upon this selection I believe devolves a great deal, for upon this will depend much of the credit or discredit which will be given to electro-therapeutics. Dr. Newman's demonstration this evening shows very conclusively the diffusive effects of the galvanic current, and should impress upon us the fact, that in using this current we are employing one which is capable of doing a great deal of mischief. Dr. Newman has well said that the person using galvanism for electrolysis must understand this agent. A milliamperemeter is a necessity, and every step of the process must be intelligent. With a static machine one cannot break down tissue or set up any severe congestion, although the treatment may be made very unpleasant for the patient. It is entirely different with the use of electrolysis without proper knowledge and experience. Dr. Newman's success in his own specialty has been wonderful, and I believe future generations will appreciate his work even though the present generally does not. He has laid out a line of action far more wise than his contemporaries appreciate. The reason for this lack of appreciation is to be found in the fact that those who have endeavored to follow Dr. Newman and have been unsuccessful have gone to work in a rough, haphazard, and wholly unscientific way. They obtained cauterization instead of absorption, and they consequently condemned the method when in reality their failure was due to their own ignorance of the proper method to be employed. Dr. Newman's method is employed by relatively few, which I believe is chiefly because it was made known before the introduction of the milliamperemeter and too many blundered, not having Dr. Newman's touch sense of current strength. Everyone who endeavors to use electrolysis without intelligent knowledge of his apparatus will come to grief.

I desire to express my thanks to Dr. Newman for what he has done for the science of electrolysis in the past, but words fail me; time only will show the true value of the method. Ultimately the medical profession will recognize its merit.

In his clinic to-day a young woman was treated by electro-

lysis for a stricture of the rectum. The first electrode passed seven weeks since was not much larger than a lead pencil, but to-day an electrode was used four times that size and passed through strictures to fifteen inches above the anus. This gain has been attained by one treatment weekly. She has not been incapacitated for work, has suffered no inconvenience or pain, and has already an excellent prospect of a complete cure.

I hope we may be able in some way to engraft these very useful and important therapeutic methods where they will become the established means to be regularly employed in all conditions adapted to their use.

Dr. Josephine G. Davis: I have witnessed Dr. Newman's good work for many years. The case just referred to was sent by me to Dr. Newman because of his excellent skill in the use of electricity. This woman had been treated previously by dilatation, and had been injured thereby.

Dr. Clarence E. Skinnner: There is one point which has not been touched upon, and that is the efficacy of negative electrolysis in healing old ulcers and sluggish ulcers, or where there are superabundant granulations. The action of electrolysis in judicious therapeutic doses is never prejudicial to healthy metabolism; it is always a stimulant in the line of normal tissue reconstruction under these conditions. Where there are superabundant granulations unless they are *very* abundant it is not usually even necessary to pare them down with a knife; the application of the negative pole will usually be sufficient. But we must be careful not to use enough current to cauterize. The general impression among physicians is that this use of the electrical current is tantamount to cauterization, but such is not the case. We can, of course, produce cauterization, but that is what we should avoid. The first phenomenon noticed after placing the negative bare metal electrode on a surface covered with superabundant granulations, is that these granulations swell up and become congested with blood; then a little foam appears at the point at which the negative pole touches the tissues. Ordinarily such an application, given twice a week, will cure the most obstinate ulcers and leave a very soft, elastic and healthy scar.

I have in mind at the present moment a case in which a sinus about an inch and a quarter deep existed after an operation for appendicitis. It refused to heal under the usual surgical dressings and applications, and we began to suspect that there was some foreign substance in the sinus. I passed a bare metal electrode to the bottom of the sinus and gave five electrical treatments, at the end of which time there was no sinus left.

PROBLEMS IN PHYSICAL THERAPEUTICS.

Dr. Snow explained that the remainder of the evening would be devoted to the discussion of any subject proposed in Physical Therapeutics, and opened the discussion by asking for information concerning the use and results of electrolysis in cases of stricture and obstructions of the eustachian tube.

Dr. Newman: I have written on this subject, and have constructed a special instrument for the electrolytic treatment of strictures of the eustachian tube. One inch is taken off the ordinary eustachian catheter, and there is inserted a movable instrument with a silver bulb. The instrument is introduced through the nostril until the stricture in the eustachian tube is found. Then the instrument is connected with the negative pole and the positive pole is placed in the patient's hand. The instrument is slowly and gently pushed forward until the stricture has been passed. The treatment, in other words, is conducted in the same manner as in the treatment of other strictures. In a recent full discussion of this method, the only one present who opposed it was Dr. E. Gruening. I have had several cases in which I have employed this method with good results.

Dr. Pilgrim: I have used this method probably in fifty cases of eustachian diseases, and while I am sure I have done no harm I must confess that in many instances the results have been disappointing. It is stated that middle-ear disease may be set up by the use of the galvanic eustachian catheter, but certainly my experience has not substantiated this view. I have made it a rule not to repeat the treatment oftener than once in ten days, and never to employ a current stronger than five milliamperes. Such a result could not be obtained with the Politzer bag or with the mere passage of an ordinary eustachian catheter. The stenosis may be in any part of the tube, but it is most commonly near the pharyngeal end.

Dr. Skinner: Dr. Pilgrim speaks rather modestly of the small number of cases he has seen benefited, but it should be remembered that in such an intractable disease if benefit accrued in only three or four per cent. of the cases, the results would still surpass those by more common methods.

There will be a meeting of the Clinical Society of the New York School of Physical Therapeutics on Friday evening, March 20, at 8.15 P. M. The programme will consist of a paper on *The Principles of Treatment in Disease of the Digestive Tract*, by Sigismund Cohn, M. D. The paper will be followed by a general discussion.

The profession are invited to be present and participate in the discussions.

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PHOTOTHERAPY—A TEN-YEARS' RETROSPECT.

BY MARGARET A. CLEAVES, M. D.

In view of the wide-spread interest in the subject of light therapy at this time, the following history of electric light as a therapeutic measure, especially in this country, is given.

The classic experiments of Wm. Siemens in 1880, made for the purpose of determining the effects of electric light upon vegetable life, without doubt had an influence in attracting professional attention to the value of electric light for therapeutic purposes.

The conclusions reached by Siemens may be summarized as follows:

(1) That the electric light is efficacious in producing chlorophyll in the leaves of plants and in promoting growth.

(2) That an electric center of a light equal to 1400 candles, placed at a distance of two meters from growing plants, appears to be equal in nutritional effect to average daylight in March, while greater effects may be obtained by more powerful light centers.

(3) That while under the influence of electric light, plants can sustain increased stove heat without collapsing, a circumstance favorable to forcing by electric light, and showing the influence of light as a vital stimulant.

These experiments were confirmed later by Herve, Maguon*, Prillieux†, Sarat, and others.

In 1889-90 experiments were made at Cornell University, which showed that: (1) The electric light, properly employed, compares favorably with sunlight in its power to promote protoplasmic activity.

(2) Electric light acts as a tonic to plants, enabling them to endure adverse conditions which they would not otherwise be

* Compt. Rend. 53, 243.

† Compt. Rend. 69, 410.

able to resist; and acts as a true vital stimulus, the effect of its use at night to supplement the influence of daylight, being practically identical with that of the prolonged solar day of the arctic regions. The power of the electric arc to destroy or inhibit the action of bacteria, to produce perspiration, erythema, and pigmentation, to cause, when still more intense, an electric sun-stroke, are familiar facts.

In 1891 Dr. J. H. Kellogg, of Battle Creek, Mich., began to use the incandescent electric light therapeutically and to devise apparatus for the purpose. His work, experimental and chemical, was reviewed in a very exhaustive paper * which he read before the American Electro-Therapeutic Association at its fourth annual meeting, held at the Academy of Medicine, in New York City, 1894. So far as is known to this writer, this was the first use of the incandescent electric light for therapeutic purposes in this country, nor is she cognizant of its prior use elsewhere.

In 1893, the American Electro-Therapeutic Association, which has always been in the vanguard of progress, at its third annual meeting, and through its president-elect, Dr. W. J. Herdman, inaugurated a standing committee on "Electric Light Apparatus for Diagnosis and Therapy."

The late Dr. Plym S. Hays, of Chicago, was made chairman of this committee, of which the writer and one other physician were made members. Dr. Hays died within a very short time after the meeting, before any work was done, and the other member declined to serve. The work of the committee, therefore, devolved upon the writer.

In 1893, in addition to the apparatus for diagnostic work, there was installed in her office an electric arc cabinet, manufactured in Newark, N. J., in which the lamp was placed in front of a tin reflector and arranged so that it could be raised or lowered at will. The arrangement of the arc was not dissimilar to that of the arc in the cabinet, described and shown in a recent number of *ADVANCED THERAPEUTICS*,† in which many of the suggestions made by the writer have been utilized, nor to that of the cabinets now manufactured in Germany.

This, and also a portable hand-fed arc with a very strong plano-convex condensing lens and reflector as well, for the

* Transactions American Electro-Therapeutic Association, 1894.

† February, 1903; Cohn.

localization of the rays of light, formed the equipment. With each lamp, oblong pieces of glass of different colors and suitable size were provided, to interpose between the patient and the light, according to the effect desired.

In the writer's report* to the American Electro-Therapeutic Association, at its fourth annual meeting, New York Academy of Medicine, New York City, in 1894, this equipment was described, and a case of anæmia with enuresis reported, also cases of neuralgia and neuritis treated by means of the electric arc. So far as is known to the writer, this is the first report to the medical profession on the electric arc as a therapeutic measure.

The initial apparatus was discarded in 1895, and the present arrangement of arc light mechanisms installed, both in office and dispensary at the same time. This equipment, consisting of a cabinet with two arc lamps provided with reflectors and a couch upon which the patient reclines, has been in daily use ever since.

Until 1900 the class of cases treated were of a general rather than a local nature, although in 1895 a case of psoriasis, followed shortly by one of eczema, were successfully treated by means of the electric arc. Among the conditions treated secondary anæmias, pulmonary tuberculosis, bronchitis, asthma, neurasthenia, neuritis, convalescence from grippe and from broncho-pneumonia have formed the major part.

In a paper entitled "The Electric Arc Bath," † read before the American Electro-Therapeutic Association, at its eighth annual meeting, September, 1898, six cases of pulmonary tuberculosis were reported, one case of bronchitis, one of psoriasis, and one of eczema.

To the writer's knowledge, these were the first cases of pulmonary tuberculosis treated by the electric arc and reported to the profession. Two of the cases reported, one clinically cured, the other improved, have been kept in touch with, and remain well to-day.

Since then the arc light and concentrated sunlight has been used in similar conditions, and current medical literature contains reports covering similar cases.

The use of the electric arc for therapeutic purposes was first

* Transactions of the American Electro-Therapeutic Association, 1894.

† New York Medical Journal, January 28 and February 24, 1899.

suggested in Germany by Friendlander in 1896, but prior, or about the same time, Imbert de la Touche, of Lyons, France, had installed an electric arc light cabinet in his office, similar to the one devised and arranged for the writer in 1895, and for which the plans were furnished by her. La Touche published a description of the cabinet, and also of the therapeutic uses of the arc, in the *Revue d'Electrothérapie*, June, 1896.

In 1893 Finsen, who had been devoting himself since 1890 to the study of light, to determine its physiological action, gave his results in the form of a red light treatment for smallpox to the profession, a means which had been employed for many years in an empiric fashion, but which, as the result of his work, was placed upon a scientific basis.

Having demonstrated that the harm to an inflamed and sensitive skin, as in smallpox, was due to the chemical rays of light, Finsen carried his investigations still further, and showed that the bactericidal action of sunlight—a well-known fact—was almost entirely limited to the blue, the violet, and the ultra-violet rays, and that this action was greatly intensified by focusing the light through lenses.

In 1895 he made his first therapeutic application of electric light to a case of lupus with an ordinary arc lamp and a hand lens. Subsequently, in 1896, he constructed an apparatus with a series of condensing lenses of quartz, which permits the passage of the high-frequency waves of light, to use with an 80 ampere arc, in which the heat rays were cooled by running water, and which is known the world over as Finsen's tube, and the method of treating skin affections, as Finsen's method. This invaluable contribution to the science of medicine is so well and favorably known as to render comment unnecessary. Finsen's work is not only of value as an exponent of light therapy, but because it has unquestionably given an impetus to X-ray therapy, so completely dominating the professional world at this time.

In consequence of the indiscriminate use of these agents, careful and painstaking work will be required to sift the evidence obtained from clinical observations to determine the conditions to which they are applicable; and also in what conditions the irregular and high-frequency vibrations of the X-ray should be used, and in what the rhythmic high-frequency vibrations of light. The difference in action is in degree not kind, as is the difference in physical nature, and while certain condi-

tions will always lend themselves to the one or the other by reason of their pathology, there are others where the indication will be clear and unmistakable for light vibrations, and others again where the higher energy of the X-ray will be as clearly indicated.

Out of the present chaos all these facts must and will be evolved, and the exact value and place of these agents determined. Finsen's work and method attracted the attention at once of scientists and physicians, especially of the dermatologists all over the world, and the list at this time contains a goodly array of names.

As this sketch refers more especially to the pioneers, they are not instanced here, however.

Prior to 1900 all of the radiant energies of the arc were used in every case as they still are in other than local affections.

In 1899-1900, the writer installed a Finsen tube. Because of the expense of current to operate the 80-ampere electric arc, and the long sittings required taxing both physician and patient, it was, after two years, laid aside and other mechanisms used instead.

Since Finsen gave to the profession the tubes which bear his name, various arrangements of arc light mechanism have been devised for the use of the chemical rays of light alone. One of the earliest in the field, and an exceedingly good one, is that of Lortet and Genoud of Lyon, also known as the London Hospital Lamp.

This requires a smaller ampere arc, can be used nearer the source of light, requires shorter sittings, and has greater power than the Finsen tube, because the light is used nearer its source.

Still later, Bang, Finsen's assistant, devised a portable lamp with water-cooled iron electrodes. Iron electrodes are richer in the chemical rays than the carbon, and were therefore used. This is a lamp of great actinic power. A lamp is constructed on the same principle by Kny-Scherer, of this city, and for some months the writer has had one in use. It is shown on the following page.

Experiments have been made showing (1) that its spectrum is very rich in the violet end, (2) that photographically it has intense actinic activity, and (3) that it is bactericidal. Experiments were made to determine its bactericidal action with the collaboration of Dr. E. E. Smith, and resulted in the destruction

of staphylococcus pyogenus aureus and of typhoid bacilli. A minute's application produced well-marked erythema, with sunburn and peeling of the skin. This lamp is easy to handle. The electrodes are kept cool by the constant circulation of water, and the beam of white light is absolutely cold. It is provided with a simple quartz lens, which serves as a compressor, to render the part anæmic.

It can be operated upon the direct current circuit of 110 volts, and the manufacturers are constructing one to use on the alter-



Fig. 1.

nating current circuit as well. If the physician has the proper controller for his X-ray apparatus, it can be used instead, and the expense of a separate rheostat obviated.

The equipment is not expensive, and because of this fact and its portability, as well as its great actinic power, it gives promise of a field of much usefulness. It is well constructed, practical, and easy to keep in order. The writer has used it in a case of recurrent epithelioma, two nodules on the nose of the patient, and after four weeks' treatment, with exposures of from three to five minutes, three times a week, they were reduced fully two-thirds in size. It has been found of value in uterine cancer, assisting in the healing of the tissues which had been subjected to the destructive action of X-ray vibrations.

Sensitiveness and soreness in a rodent ulcer were relieved and the healing process furthered.

The Broca & Chatin lamp, which is used in Paris, is simpler, less expensive to operate, and more easy to handle than the Finsen tube, does the work in less time and with less frequent sittings. One of the carbons of this lamp has an iron core, and is so constructed as not to require any cooling with water. Still another lamp is the one devised by Minim of St. Petersburg. In this country there is the Actineolyth, an ordinary arc lamp, fitted with a water bath to cool the heat rays, which is provided with especial glass lenses adjusted as in the first portable lamp used by the writer in 1893.

In a recent number of *ADVANCED THERAPEUTICS*, the writer described a special arrangement of the marine searchlight, which forms part of her equipment for general applications of light, by which local applications could be made on actual contact, with the compressor, if desired, or in vaginal work, at the focal distance, which is several inches from the end of the funnel-shaped attachment. This funnel-shaped attachment is made of copper, and has an opening of 1 1-4 inches in diameter.

There seems to have been a misconception * of the arrangement, therefore it is referred to again. The ability to use it without heat depends (1) on the arrangement of the focus, changing it from a short to a long one; (2) by utilizing the carbons after the first burning, when resistance is overcome to such an extent as to minimize the heat rays, and (3) by the funnel-shaped attachment. The lack of heat is in no sense due to the dead point in the light caused by the carbons, as is stated. On the contrary, the beam is white, vivid, of intense transilluminating power, the spectrum of which is extremely rich in the violet red.

Photographically it shows great actinic power, and its bactericidal action is also great, while clinically it does the best of work. The light from this lamp possesses greater penetrating power than that from the iron electrode lamps because there is greater amperage.

But not only are the incandescent electric light and the electric arc light available as a source of blue violet and ultra violet light, but influence machines and high-tension coils as well. It

* Hopkins, Uterine Carcinoma, *Philadelphia Medical Journal*, February 21, 1903.

has long been known that the negative terminal of the influence machine is extremely rich in the chemical rays of light, and every spark-gap across which the discharge leaps is illumined by a pure white light, devoid of heat and of great actinic power.

In 1901 Leduc* suggested utilizing the influence machine as a source of ultra violet light, and used these rays with a quartz compressor, as in the Finsen method. He was the first to use the influence machine for this purpose.

He found these rays to produce an intense fluorescence on a plantino-cyanide screen without concentrating the beam, and



Fig. 2.

also photographic effects surpassing those of sunlight. In the same year Görl demonstrated that the spark of a high potential induction coil, as an X-ray coil, for example, was also extremely rich in the high-frequency waves of light. He devised an apparatus similar to the one shown in the cut for utilizing this property of the spark.

The above apparatus has been in the writer's hands for some months, and is of unquestionable value. It consists of a series of metal rods, set in a hard ruber or mica base, and tipped with metal balls about 1-4-inch in diameter. The electric spark discharges itself across these spark-gaps. It is fitted with a cap containing a quartz lens, with which pressure is made on the part to render it anæmic. The tissues are transillumined by this light as by the light from the arc.

Photographically the actinic power is not so great as with the electric arc, i. e., the lamp shown in Fig. 1. The spectrum is very rich in the violet end, but not so intense as with the arc

* *Comp. Rend.* March 4, 1901.

light. No action, even with a thirty-minute exposure, was had on staphylococcus pyogenus aureus, but the growth of typhoid bacilli was retarded. The condenser originally used by the writer was provided with a lens of pebble glass, and the effect of the ultra violet light was minimized, as these rays do not pass through glass.

The perfected apparatus contains lenses of quartz. It may be connected with the primary or secondary circuit. In a case of an acutely inflamed labia majora, red, hot, swollen, painful, with suppuration imminent, an exposure to the ultra violet light from the static condenser not only relieved the pain and soreness but established resolution, and twenty-four hours later there was no trouble save slight enlargement. Nor does our means of using the blue violet and ultra violet light end here. Vacuum tube electrodes used on the secondary circuit are rich in blue violet, ultra-violet, and even in X-ray radiance, but being of glass the effect of the chemical rays is less than when sifted through quartz. The discharge of the X-ray energy, on the other hand, even though small, is not interfered with, and without doubt is of material assistance in securing results.

In this connection it is interesting to note that Haga and Wind of Holland have confirmed their original experiments, which proved the existence of diffractive phenomena. They conclude that there is no longer a doubt that the X-rays are, like light rays, perturbations of equilibrium of the ether. To the writer's mind this seems unquestionable.

The therapeutic value of electric light is established beyond peradventure. Especially is this true of the electric arc. To Finsen the profession owes much for the thorough and scientific manner in which he has demonstrated the action of the chemical rays alone, and their usefulness in skin affections, especially those of a tubercular nature. The source which provides the individual operator with these rays is a matter of choice.

Greater penetrating power must of necessity characterize the arc light than the condenser spark, and unquestionably the former will secure better results in long-standing and well-organized pathologies than the latter. But not only are the chemical rays of value, but all the radiant energies of the arc as well, which, in their action upon the body as a whole, are comparable only to the sunlight, without which life would be impossible.

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THE DEVELOPMENT OF THE RADIOGRAPH.

BY GEORGE C. JOHNSON, M. D., PITTSBURG, PA.

Assuming that the plate has been correctly exposed and removed to the dark room it is now that the effect of the invisible Roentgen ray is to become visible. Certain parts of the plate have received more of the chemical rays than others. All parts have received some, save in case where a very thick foreign body, usually metallic in its nature, has intercepted the ray.

An X-ray plate is simply a plate of clear glass, coated with an emulsion of a silver salt, bound on with gelatin, and kept during manufacture and up to this time carefully protected from every ray of actinic or chemically active light. Upon the surface of this plate, and indeed through it, passes the Roentgen ray, in varying intensity, depending upon the density of the structures or objects imposed between the tube and the plate, and in direct proportion to the strength and time of the action of the ray there takes place a chemical change in the silver composition of the coating or emulsion.

This change is not shown by any visible change in color or indeed in any way. The process necessary to make this record of action visible is called development.

All developers work in practically the same way, i. e., by reducing and blackening the parts of the plate that have received the most action, and these first. If continued far enough they will attack later the rest of the plate and the result is a failure. All the developers in common use consist of three factors.

1st.—The reducing agent or agents.

2nd.—The preservative for the reduced agent.

3rd.—The alkaline or accelerating factor.

The restraining agent does not belong to the developer proper. Of the exact chemical nature of the change which takes place in the film of the plate we are as yet ignorant, but we do know how to profit by this change and by the use of a suitable reducing agent to change the portions of the film which have been acted on, into varying degrees of capacity, depending upon the amount of the metallic silver reduced in each particular spot, thereby forming a negative,

the direct reversal of the image of the same object as visible through the agency of a fluorescent screen. This image is further cleared and rendered permanent by the action of a silver solvent, usually a bath of the hyposulphite of sodium, to which is sometimes added a proportion of chrome or other alum for the purpose of tanning or hardening the soft gelatin film. While there are some developers, for instance, ferrous oxalate, which of itself will reduce a plate, yet the most useful require some alkaline agent to render them effective. The market is full of developers, and the German chemists present us with a new one duly patented and put up in a little tin box at the rate of about one a month.

The man who experiments with all these will know much about developers and little about development. They are all products of synthetic chemistry, and are derivatives of the benzene series. Practically, a man should limit himself to one developer, or one combination, and if he learns this combination he can do anything he wishes with it.

Developers as classified by Dr. Elden into "hard" and "soft" working.

The first class contains Pyrogallie acid, Quinol or Hydroquinone, and Adurol.

These develop slowly and give great contrast and brilliancy. The soft-working developers Amidol, Metol, Eikonogen, and Rodinol develop quickly and without great contrast, but with softness and detail.

Between these stands Ortol. As a general thing, the man who makes a photographic or X-ray plate knows what developer will work best with it, and one is safe in using the formula sent with the plates.

However, I believe that a great deal of time is wasted by the average man who is learning radiography in experimenting with plates and developers.

There are three good X-ray plates on the market, and it is largely a matter of taste as to the best. Where extreme sensitiveness is desired, as in diagnosis of renal calculi, I prefer the Cramer X-ray. These plates are a little hard for the beginner to handle, but they are uniform and yield excellent negatives.

The Carbutt and Seeds processes are also excellent. The Seeds process plate is rich in silver and not so dangerously

sensitive to ruby light; it also is free from fog under most conditions, and permits of a wide latitude of exposure and development. Pick out a good plate and a good formula for developer and stick to it.

The dark room should be dark, no light save that from the ruby. The best ruby oil lantern is not to be compared with a 16 C. P. incandescent ruby globe covered with an orange X-ray envelope.

The plates oftenest used are 8 by 10 and 11 by 14 in size, and each should be developed in a tray of its own dimensions. A sufficient quantity of developer should be prepared. It takes one pint of developer for an 11 by 14 plate and 12 ounces for an 8 by 10. Less than this quantity will permit a surface oxidation during development. I shall give but one formula for developer, viz., pyro.

In 16 ounces of distilled water in a large mouthed jar, dissolve 1 1-2 ounces of Seeds C. P. Sulphate of Soda. When completely dissolved add 1 ounce of Mallinkrodt's Pyrogalllic acid; stirring rapidly. Then add 5 drops of C. P. Sulphitic acid, place in a one-pint amber, rubber-stoppered bottle, marked solution No. 1.

In 16 ounces of distilled water dissolve slowly 2 ounces of Seeds's C. P. Carbonate of soda, marked solution No. 2.

To make developer, take of No. 1 one ounce; of No. 2 one-half to 1 ounce; of pure water, at a temperature of 50 degrees, from 6 to 8 ounces; mix and add of a 10 per cent. solution of the bromide of potash, 2 drops. Pour the solution into the tray. Place the plate face up in the tray, and by a quick tilt flow the developer over the entire face of the plate. If an air bubble forms and adheres to the surface of the plate or a portion of the surface of the face of the plate should fail to be covered immediately, a spot will be found on the finished negative. If the exposure be correct, development will now proceed more or less rapidly. If the subject be leg or arm, the outline appears quickly, as a white body, the edges of the plate not covered by the limb during the exposure turn gray and rapidly black. The flesh on the limb next fades, leavin gthe bone still white.

Development must then be carried on until the bone itself almost ceases to transmit light. The process is now complete and from ten to twenty minutes of time has elapsed.

The tray should now be tilted and the solution poured off and thrown away. Never try to economize by using a developer the second time. The tray should now be flooded with cold water and the plate thoroughly washed and placed in the fixing bath, the formula of which follows:

Hypo, 2 pounds; Seeds C. P. Sulphite of soda, 2 ounces; water, 96 ounces; dissolve and mark solution A.

2nd.—Chrome alum, 2 ounces; water, 32 ounces; Sulphitic acid, C. P., 2 drams; dissolve, mark solution B.

Pour B into A while stirring rapidly. The plate must be left in this bath until thoroughly cleared and until all the silver or whitish fog has disappeared from the back of the plate. It should then be washed under running water for a few minutes, wiped carefully on both sides with a tuft of absorbent cotton, and washed in a tray or box under running water for at least one hour. It should then be removed, wiped again with wet cotton, and set up on edge to dry. It is then a permanent negative.

While the above process seems to be a simple one, there are yet many small points that must be observed if success is to result. Frequently the plate upon completion is found to be thin, with little contrast. This may be due to under exposure, but is more frequently due to failure to carry the development far enough. If the developer be worked at a temperature to exceed 65 degrees Fahrenheit, or if it contain an excess of the alkaline factor, the surface of the plate may darken rapidly, and the operator may be deceived by its behavior. The plate under such condition is not developed, but simply surface-fogged, which will clear up rapidly in fixing the bath. The remedy is obvious. Again, upon development a plate may be found to be hazy, indistinct, fogged. This may be due to over exposure to ruby light during development, or while placing the plates in the envelopes before exposure, or to the fact that the plates have been kept in too warm a place, or not protected in a lead box from X-rays during their stay in the laboratory, or to excessive alkalinity of the developer, or the hypo bath may have been old or exhausted.

Frequently a plate will show vague spots. These are usually due to handling the film side of a plate with moist or perspiring fingers before development. Holes in the film

are usually due to air bubbles attaching themselves to the surface during the beginning of development. When they form these may be removed by a tuft of cotton wet with developer.

Frequently a plate will show a dim outline of an object which was *behind* the plate during the exposure. This may be avoided by backing the plate with a thick sheet of lead during the exposure. I have not spoken of the methods by which an over or under exposed plate may be saved in development.

The best remedy for such a plate is to throw it away and make a correct exposure. Such a plate is never satisfactory.

In conclusion learn the capacity of your machine under varying conditions and to judge the current passing through the tube and govern the length of exposure by the quantity and penetration of the rays emitted during the exposure. Balance these against the size, weight, and muscular development of the patient. In this way only can a correct exposure be formulated.

Develop slowly under a safe light with a cool developer and the result must be satisfactory.

The successful radiographers are those who use one brand of plates, one developer, a given type of apparatus, and a tube with whose every mood they are familiar.

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THE RELATIONSHIP OF PSYCHIC SUGGESTION
TO ELECTRO-THERAPEUTICS.*

BY MAURICE FIESCHOR PILGRIM, A. B., PH. D., M. D., BOS-
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At the threshold of this brief discussion, I would like those who compliment me with their attention, to distinctly understand that I am not in sympathy, either wholly or partially, with the popular movements of the present time, crusading under the various names of "Christian Science," "Mental Science," "Magnetic Healing," and the like. On the contrary, considered as *exclusive* systems of healing or caring for the sick, they should only be mentioned to be condemned. In order to justify the founding of a system upon any truth, the claim of which is its exclusiveness, it must be composite, not fragmentary; otherwise it is a menace to the safety of the individual and the community. Human life is too precious to be remanded to the care of those who, ignorant of the construction of the human body and of the laws under which it functionates, deny its existence and are unable to recognize its deviations from physiological function or changes in its structure. Nevertheless, from the point of view of ultimate results, there is very much that has happened under all these alleged systems of healing that might well and properly challenge the serious attention and careful investigation of the profession to which we belong. Is it not generally true that every great popular error has contained some germs of important truth? May not that be true in respect to those healing crazes which have been and still are sweeping over the country. There can be no more bitter error, it seems to me, than continued depreciation or denial of patent facts. The fact that the alleged cause does not appear to equal the observed effects, is not, to my mind, a valid excuse for ignoring palpable results.

To deny that scores of sick people—many of them

* Read at the Meeting of the American Electro-Therapeutic Association at the Hotel Kaaterskill, Catskill Mts., New York, September 4, 1902.

unsuccessfully treated by those bearing the degree of our profession and abandoned to die—have gotten well under these alleged systems of healing, is almost as great an error as to believe the absurd propositions exploited as conditions-precedent upon which they insist that the cures are necessarily based. Had we better not proceed to investigate with a view of discovering a rational, a scientific explanation of manifest results rather than to continue the puerile and illogical course of doggedly denying them? Would not such procedure better comport with the traditions of an expanding and progressive profession? Besides, it is well to remember that our denials have accomplished little or nothing. They have utterly failed to stem the rising tide; on the contrary, it is greatly to be feared that they may have contributed to swell the current that has been setting in the wrong direction. At all events, "Eddyism" has steadily grown in popular favor and acceptance for the past thirty years. It now embraces two millions of adherents between the Atlantic and Pacific oceans. It has invaded Great Britain, crossed over into Germany, and is spreading over the European continent. And this has occurred, let us remember, while we as a profession have been persistently declaring that there is nothing meritorious in these metaphysical systems of healing,—that no one actually sick was ever cured under them. While we have been thus declaring, many of the converts to these fallacious systems were our patients, of whose cure by the means at our command we despaired, and whom we abandoned to what we sincerely but regretfully believed was speedy and inevitable death. We have seen them get well under these delusional systems of healing. Why did they get well? How were the cures brought about? What were the effective causes—for there must have been a cause or a series of them—of these unexpected recoveries?

Do we quite know, or have we, as a profession, really cared enough about it to try and find out? It is to be feared that our attitude has been that of standing disdainfully aloof in the presence of these interesting happenings. Is there not an ultra-conservatism as deadly to all progress as ultra-radicalism is to safety? Might we not have rendered these alleged systems of healing well nigh clientless had we been disposed to investigate, discover, and appropriate whatever

of merit they possessed, instead of exhausting our energies in sneers, denials, and ridicule? Truth lies usually between the extremes. Dare we assert that while these so-called systems of metaphysical healing have hidden whatever virtue they possess under a grotesque maze of transcendentalism, we as a profession have not plunged deeper into the mire and bogs of abject materialism? While lost in our contemplations of the creature, have we not forgotten the Creator? Have we not accorded to mere matter too much consequence and force, and unconsciously permitted it to set narrow limitations and bounds to our activities and usefulness which fuller scientific investigation would not have sanctioned? Have we not complimented matter with too much of our thought and life until it has throttled us in its tyrannous embrace and extinguished the "inner light"? It seems to me that the trend of so-called medical progress of more recent times has been strongly in the direction of intense materialism. Nevertheless, there is no attempt at denial upon the part of reasonable persons that the impossible of to-day is constantly becoming the realized possibility and accepted fact of to-morrow. Are the "Roentgen X-rays" really curing cancer? Some of us remember how chimerical the idea was regarded when first suggested, and by some electro-therapeutists, too. Time and opportunity have, however, shown that the idea did not originate "in a brain intoxicated with a superabundance of electrical enthusiasm," as a respectable writer of not long ago alleged. The quotation here given is his. What would he probably say to-day upon this subject?

For the purpose of bringing this subject to your attention in as concrete form as possible, and with no intention at this time of considering them in detail or in their order of arrangement, the following postulates are submitted:

I. Psychic suggestions made for therapeutical purposes, are physical stimuli initiated in, and sent from, the operator, which evoke in the patient the kinetic energy called *vis medicatrix naturæ*.

II. Psychic suggestion, in many if not in all cases will, if properly employed, materially aid and supplement other forms of treatment directed to the relief and cure of diseased conditions of the human body.

III. A large proportion (if not an actual majority) of physicians now recognize, theoretically, the potency and value of this agent, and many of them are successfully using psychic suggestion in conjunction with other methods of treatment.

IV. This force, whether consciously recognized or not, has been an important factor, to a greater or less degree, in all systems of therapeutics. Like electricity, it has been an ever present, though, for the most part, an unrecognized and unutilized force; and is as ancient as the universe which it permeates and of which it constitutes an important part. It is only our beginning recognition of it as a potentiality that is really new.

V. All the conceded curative results which have followed the application of modern fads—"Christian" and "Mental Science," etc., etc., etc.—to disease of the human body, are due wholly to the unwitting employment of psychic force with occasional success, and not at all to any merit inherent in or peculiar to these alleged systems as such.

VI. This force can be made to serve our purpose more effectively when it is recognized, correctly estimated, and intelligently directed, thus removing or greatly minimizing the dangers which now attend its employment as an exclusive system of healing by those ignorant of the law under which it operates, and of the construction and physiology of the human body, and the morbid conditions which may affect it.

VII. It is the duty of the profession of medicine, while safeguarding the health and life of the community, to protect as far as possible the public against the baneful results of its own follies. This can be best accomplished by physicians utilizing in their own practice whatever of merit may reside in these so-called systems of healing, thus robbing charlatanry of its clientèle and vocation.

VIII. Psychic force bears a close relationship, in many respects, to electric energy, and can be more advantageously combined with, and utilized in, electro-therapeutics than in any other department of practice. The methods of the electro-therapist are such as to make the employment of psychic suggestion easily available without discussion, or antagonizing the beliefs or prepossessions of the patient. The residual benefits inure not alone to the patient, but by enlarging its sphere of curative possibilities, to electro-therapeutics as well.

We speak of power, of force, and generally as though it resided wholly in matter. That it does to a considerable extent, it would seem that no really sane person would seriously attempt to challenge. But does all power reside there? Does it originate there? These, it seems to me, are basic questions which it becomes important to correctly determine.

It is a difficult task for anyone to attempt to define what power really is. It certainly is not matter, though it works through matter, and thus manifests itself to our consciousness. But our conscious recognition of an effect is not power. Water is not power, nor is steam, nor wind, nor electricity, but power works through them all. What is electricity—that subtle, mysterious something that we electro-theraputists are daily employing in our work? We have our hypotheses as to how the electric current when applied to the human body effects certain nutritional and structural changes—and we believe they are reasonable hypotheses—but dare we assert, unqualifiedly, that they are anything more than that? Could we demonstrate it even if we cared to make the positive assertion?

It seems to me that no perfectly balanced person will seriously deny that drugs and electricity do have an effect upon organisms—effects per se, inherent in the agents themselves regardless of the conditions under which they are administered or the personality through which their exhibition takes place. We do not always know their *modus operandi* and must frequently be content to recognize their effects empirically. Many of the valuable things in medical procedure and therapeutics came to us empirically at first. In some instances, their rationale was subsequently discovered; in others, it has never been satisfactorily explained. Nevertheless, we as a profession have not felt justified in rejecting a meritorious agent simply because the rationale of its action was not immediately and fully disclosed. Therefore, let me inquire if it is logical to assume after we have prescribed the indicated drug or administered the current of what we deem the proper voltage and amperage, and otherwise done all that our experience (and that of our colleagues, too, perhaps) dictates, that that is the limitation of all power? What right have we to assume that Infinite Wisdom has no

other channels through which to reach humanity with its beneficent bestowals than through the *material side* of the profession of medicine?

Why should we assume that we have a permanent and perpetual pre-emption, *through our material methods and agents*, on all the revelations concerning the human body, and the laws governing its welfare, which a beneficent Creator may see fit to give to the world? To make such an assumption is, to my mind, as inconsistent and arrogant as are the contentions of the rankest Christian Scientist in denying to drugs or electricity a resident force and in absurdly insisting that all the power they possess is due solely to the accumulated thought of all the centuries which has been focussed upon them!

As electro-theraputists, our central aim and concern is, of course, the restoration of health to those temporarily deprived of it—to conserve and prolong life. How do we hope and expect to accomplish this beneficent purpose? Let us consider, for a moment, what sickness and health really mean, and how these opposite conditions are related the one to the other.

Being sick and getting well consist of certain bodily states and changes in contrast with another common condition called "health." It is one of the cardinal dogmas of biology that the structure of every living being is passing through a continuous transformation during the whole term of its existence; that each particular change which befalls it, whether healthful or morbid, is part and parcel of one unified corporeal history. Applying the logic of this broad doctrine, all diseases are included in this experience as phases of the cosmic process called evolution—temporary disturbances in the stream of continuous change by which the life of to-day hastens to become the larger life of to-morrow. In supporting this view, Dr. Bernheim asserts that "diseases are cured, when they are cured, by their own natural biological evolution. Ordinary therapeutical methods consist in putting the organism in a condition so that *restitutio ad integrum* may take place. We suppress pain, we modify function, we let the organ rest, we reduce fever, we retard the pulse, we induce sleep, we encourage secretion and excretion, and by thus acting, we allow Nature, the healer, to

accomplish her work." These words of the eminent French writer and physician are not the emanations of a mere psychologist. Nor was he writing as such, but as a physician. As a physician, he would not be likely to underrate his own profession or credit Nature with more than her due. But he plainly intimates that the real healer is the native power within the patient. The physician and his drugs or electricity are only ancillary. They are servants who exercise their skill to clear the path of Nature to enable her the more perfectly to do her work. Having done his part, the physician must leave it to Nature to evolve health by means of biological changes which are ever going on in the system.

This recuperative action, which all physicians now recognize, is centralized under another name. It is well known that all living structure, animal or vegetable, possesses this instinctive power of self-recovery. It is a form of spontaneous, plastic energy which, acting through the proper neural channels, resists disease, tends to arrest its progress, repairs the damage done, and compensates the bodily losses sustained. This inherent tendency of the sick to get well or of disease toward recovery, we know as *vis medicatrix naturæ*. The common people of the laity say it is Nature. The reverent, call it the spirit of God. Dr. J. Mitchell Bruce, of Charing Cross Hospital, London, while reviewing the progress of medicine, recently said: "We are now able to appreciate, as never before, the constructive factor which takes the form of repair and convalescence. Just as the body possesses provisions for resisting the causes of disease, so it possesses provisions for arresting its beginnings . . . quite spontaneously; that is, without the help of either the surgeon or the physician." Elsewhere in the same address, he refers to this natural faculty as a recuperative factor making "spontaneous attempts at recovery."

The intelligent employment of remedial means, as drugs or electricity, is directed to reach and evoke in the patient the inherent faculty of self-help—this is *vis medicatrix*—just when and where it is needed. The essential meaning of all therapeutics, as it seems to me, is to summon and concentrate this inherent remedial force on the obstacle to be overcome. The locomotive engineer soon learns how many pounds of steam are required to keep his train moving at a given rate

of speed along a level track; but, when there is a grade to be climbed, the pressure on the driving wheels must be increased or the train will "slow up." In some such analogous way the vital energy of the body may be regarded. A stream of given dynamic vitality is adequate to supply the human organism in health; but morbid conditions increase resistance which nature must overcome with a stream of greater intensity directed to the seat of the obstruction. This is precisely what takes place in the organism in cases of special need. When unusual demands are made upon the digestive organs, for instance, or the brain, an increased supply of blood is sent to those overtaxed structures. If there is not, the overwrought organ suffers, and disease ensues. When the flesh has been injured, Nature at once sets up a special process of healing by means of inflammation. The blood is thus made to flow faster towards the injured parts, the blood vessels dilate, corpuscles and fluids transude carrying the material to form the plasma from which the hurt is repaired. Similarly, in the case of fracture, Nature deposits along the broken portions of the bone, the cement which unites the divided fragments.

(To be continued.)



ROENTGEN RAY THERAPY AND TECHNIQUE.*

BY ALBERT SOILAND, M. D., LOS ANGELES, CAL.

The wonderful stride of the Roentgen Ray into the general therapeutic field during the past few years has been marvelous. It has proved of decided value in stubborn cases, and apparently cured a number of malignant conditions as well. Our present knowledge of its action, however, is unsatisfactory.

Each operator has his own theories and methods of producing X-rays, and the conditions met with in their production are so varying that to standardize our work is impossible. That the X-rays are of decided value, therapeutically, even the most conservative must admit, and that they are destined to occupy a most exalted position in therapeutics is equally true. Realizing this, and also that to facilitate our work with this new agent, that the best results may be obtained, it becomes necessary for those who are actively engaged in radio-therapy to compare notes and attempt to systematize the work. It is with this end in view that these lines are written, hoping that others will be stimulated to give their advice and experience.

Good literature on the subject is scarce, as with one or two exceptions the X-ray journals published in this country are issued mainly to advertise certain manufacturers and "professors"; and many of their pages are devoted to a senseless wrangle about priority in the use of X-rays therapeutically.

While some cases under treatment of the X-ray go on to an uneventful recovery, a great number do not, but after reaching a certain state they fail to respond further to any amount of X-radiance. This has been my experience with at least 50 per cent. of the cases treated, and I am seeking an explanation. I cannot recall a single case, however, which has not received some benefit from the raying, and usually marvelous improvement is observed within the first half-dozen treatments. This condition makes one enthusiastic during the early part of treatment and often leads the operator to promise a speedy cure. Epithelioma in which all pain and discharge have ceased after five to fifteen treatments, and which has become much smaller and healthier in appearance, gradually

* Read before the Los Angeles County Medical Society, Friday, December 12, 1902.

ceases to improve, and no amount of raying will then alter its condition. In some of these cases I have used both coil and static machine, low and high vacuum tubes, long and short exposures, and even produced a severe dermatitis without changing the condition of the tumor in the least. Why do not these cases respond further and continue to improve? Is it because the recuperative limit of patient has been reached, or is it due to the probability that we have not as yet learned to manipulate the apparatus fully? There are of course many intercurring conditions to overcome and every case has to be studied and treated on its own merits.

I will not attempt to go into the action of the X-rays upon human tissues. They are both chemical and physiological in nature, and any state from a mild leucocytosis to that of complete necrosis of the tissues can be produced at will with it. It is well to remember that in a far advanced malignant case raying should not be carried to a point where much pyrexia is induced.

The question of high and low vacuum or hard and soft tubes is of vast importance to the average X-ray worker and demands some attention. Briefly stated a low vacuum, also called soft tube, is one from which the air has not been so fully exhausted. Such a tube contains enough molecular matter to make a fairly good conductor and offers but little resistance to the current used to excite the tube. A high vacuum, or hard tube, is one which has been highly exhausted and contains very little residual gas. This tube offers great resistance to the exciting current and requires a more powerful generator to illuminate it. A medium vacuum tube occupies a varying intermediary position between high and low vacuum. Unfortunately a standard cannot at present be established for these different vacua and each operator must judge for himself from his own exciting apparatus and tubes their degree of vacuum. Not uncommonly tubes which are poorly lighted up, the apparatus being inadequate to fully excite them, are called low vacuum. This is a rather serious error, especially when an operator reports the use of such a tube in treating a case of epithelioma, stating that he used a "low vacuum" tube six inches from part treated for ten minutes every other day. It is safe to assume that with this tube fully excited the same reaction could have been obtained with a smaller number of treatments.

Granting that the tube is working full capacity and we have sufficiently powerful generating apparatus, if we wish to benefit from comparison of results in the reports of cases, it becomes necessary to state the name of the exciting apparatus, transformer, coil, or static machine. If coil, make of same, spark capacity, and the length of actual working spark gap. If static machine the number and size of the revolving plates, actual spark gap required to energize the tube, distance of anadot target from part treated, duration of each irradiation, how often exposed, and the number of treatments. I do not consider it essential to report whether the coil was actuated by street current or storage battery, giving volts and amperes developed, nor is it so necessary to give motive power or speed of static machine. The speed must of course be sufficient to fully energize the tube. Reports of cases treated, giving the data as suggested above, will do much toward bringing order out of chaos. These remarks, some of which have been often repeated, may seem tedious to experienced radio-therapists, but in view of the fact that practitioners who have had no previous experience in X-ray work are daily procuring apparatus and using same, employing them rather indiscriminately, makes it necessary to acquire some basic knowledge of the technique before using this powerful agent therapeutically.

It is difficult to say which sort of apparatus is most practical for X-ray work, coil or static machine. In the hands of the expert who makes daily use of the Roentgen rays a powerful coil is by far the most satisfactory. For the practitioner, however, who only requires to use the rays occasionally, a good static machine is satisfactory, being operated with less risk to the apparatus, and it can also be employed for the various valuable static effects. In this connection we would call attention to the "adjustable multiple spark gap" appliance, as designated and described by Dr. Williams of Boston in 1898; to increase the output of X-rays generated by a static machine. This consists of a number of metal balls mounted upon a non-conducting strip and placed in series with the prime conductors of the static machine. These little balls are placed from three to ten millimeters apart, and as the conductors pass over each ball, the spark becomes continuous between those already passed, thus increasing the tension of the current in circuit, and thereby increasing the volume of radiance in tube; varying

volume and intensity of radiance can be obtained with this apparatus and it is particularly useful with low vacuum tubes. These small metallic balls interrupting current in the circuit act as accumulators, or small leyden jars, increasing the potential of current according to the number of balls or spark gaps employed.

High-frequency coils of the Tesla type, whose output resembles the static current, can also be equipped with an adjustable multiple spark gap appliance to good advantage, but a powerful coil of the Rumkorff variety works equally well without any circuit interruptions.

I prefer the double anode German tubes, plain and with adjustable vacuum, as the "Universal type." A tube actuated by a static machine will retain a proportional vacuum more easily than one actuated by a coil. With a tube containing a small thin platinum anode and a few metal connections the vacuum will become high very rapidly and be difficult to manipulate. One containing a good-sized platinum disk and fairly heavy metal connections will increase in vacuum with use up to a certain point, which will seem to be maintained for a time, and then with additional use its vacuum will become high. The best all-round tube is one of good size containing a heavy platinum target, the rest of the metal parts being insulated by glass. Such a tube will last indefinitely if properly handled. I have used a tube of this description daily for a year, both on a coil and static machine, and it is still in first-class condition.

It has been stated that a tube excited by a static machine will not produce an X-ray burn. This is erroneous, as most severe reactions sometimes follow when using this form of excitor. In fact I have unfortunately produced very ugly X-ray dermatitis when treating a sluggish epithelioma, which would not yield to the ordinary dose of the rays, with a static machine. It is never necessary to produce a severe dermatitis under any circumstances. Where sound skin intercepts the raying, I prefer to obtain a certain amount of reaction or tanning, as this aids me in determining the dosage. To protect the parts within the circle of irradiation which do not require the rays, some form of metal should be employed which is opaque to the X-ray. I have found that the ordinary "tea lead" suffices in nearly all cases.

I heartily concur with Dr. Pusey's statement to the effect

that the rays can be made to cause a reaction through any substance which permits their passage. It is also true that neither paraffine nor vaseline offer much protection against the rays as proved by Dr. Pusey, although a newspaper account credits Dr. J. Mount Bleyer of New York with a statement that paraffine painted over the surface would protect from burning.

The hard dry skin of the face offers the greatest resistance to the passage of the rays, and is therefore more easily burned. It is well known that all electrical currents used for treatment produce the strongest reaction at the point of greatest resistance in the circuit, and the X-ray is no exception to this rule. To reduce this resistance when raying over the skin we can moisten same with a normal salt solution or, if preferred, plain clean vaseline. This procedure will permit us to use a strong light without producing as much reaction as would occur on the dry skin. Great care must be exercised in protecting the patient's eyes thoroughly when working in this vicinity, as these organs become easily inflamed. The mouth and other mucous surfaces, however, tolerate the rays very well. When raying around the mouth I have frequently noted that the skin in that region reacted before the mucous covering of lips and tongue evinced any signs of action. The proper distance of the patient from the tube depends entirely upon the vacuum and size of the tube. As the X-rays proper emanate from the anodal target, and not from the glass walls of the tube, it would be necessary to place a large tube to within an inch or two of the part to obtain quick results. As a rule I place all tubes from one to four inches from surface irradiated, in most cases just far enough from the patient to avoid "sparking" the skin, which is quite painful. For skin and surface treatment I have found a medium vacuum tube to act best, placed close to part. For internal work over sound skin a high vacuum tube eight to ten inches away will accomplish most.

In closing I wish to caution the beginner in radiotherapy to guard his own hands and eyes from any untoward X-ray and static electric effects. A pair of plain glass or mica goggles and a pair of rubber gloves will assist materially in this respect.

Conservative Life Building.

Editorial.

THE STATIC MACHINE OR COIL FOR X-RAY THERAPEUTICS.

THE disposition of some writers to underestimate the value of the X-ray derived from the static machine for therapeutic purposes is misleading and evidence of inexperience and unfamiliarity with the subject. On the other hand the opposite view is taken by many not familiar with the X-ray produced by coil apparatus. There are also others who having used both sorts of apparatus express opposite views,—the majority, however, of such favor the static machine.

After all it is largely a matter of convenience, for it is the X-rays that are the therapeutic means, whatever the source, and they are as effective from the static machine as from the coil and *vice versa*. It is familiarity with the individual apparatus, proper technique, and management which effects the best results.

It is to be regretted that prejudice so often obscures truth. Vehement opposition to rational therapeutic measures is becoming a more evident "sign of ignorance."

* * *

THE MEDICAL PROFESSION AND THE MANUFACTURER OF ELECTRO-THERAPEUTIC APPARATUS.

PROBABLY there is no subject of interest to the profession to-day in which the average physician is so poorly informed as in electro-therapeutics, and yet everyone uses at times some medical battery. How much of this apparatus is really valuable is a hidden question.

Those familiar with the subject fully realize that relatively few of the appliances made up to the present time possess such merit as would give them a place in the armamentarium of a thoroughly up to date worker. A handsome wall bracket transformer, cabinet, static machine, or X-ray coil is often easily palmed off upon the man who would make a new venture, without reference to merit, upon the dealer's say-so. This is not so much a reflection upon the manufacturer who makes and sells for profit, as upon the good sense of the man who buys a thing before he knows what he wants, or what he wants it for. When the profession becomes educated in these

subjects they will create a demand for the best and most scientific apparatus and the rubbish will be laid aside. What is needed is that manufacturers who have not done so in the past, strive to get closer to the physicians who are familiar with the demands of therapeutics, and that physicians investigate before making investments. There will even then be enough mistakes, but far less than at the present time.

* * *

AN INTERNATIONAL CONGRESS OF ELECTRO-THERAPEUTICS.

THE marked progress and general interest awakened in the subject of electro-therapeutics since the advent of the X-ray as a therapeutic means make it desirable that those interested in the subject meet frequently for purposes of discussion and general enlightenment. The Committee on the St. Louis Exposition of the American Electro-Therapeutic Association are making an earnest effort to have such a Congress held at the St. Louis Exposition in 1904. It is believed that by the co-operation of those interested in the progress of the subject at home and abroad the holding of such a congress will be made possible.

* * *

DEPARTMENT OF MECHANICAL-VIBRATION THERAPY.

WITH this issue a department of Mechanical Vibration Therapy, a method already recognized at home and abroad as of therapeutic value, is added to the JOURNAL. This department will be under the management of Dr. Lucy Hall-Brown, who is too well known to a large number of the readers to require introduction.

Mechanical Vibration scientifically applied is certain to fill an important place in therapeutics in the future because it meets, as no other agent will, many indications in which its value is becoming rapidly appreciated.

* * *

THE next annual meeting of the American Electro-Therapeutic Association will be held at Atlantic City, N. J., on Tuesday, Wednesday, and Thursday, September, 22, 23, and 24, 1903.

Progress in Physical Therapeutics.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

The penetrating power of high-frequency currents has been a subject of no little difference of opinion, and has led many observers to conclude that either the high-tension, high-frequency currents did not penetrate, but confined their action to the surface, or if they did penetrate their properties therapeutically were practically nil, in consequence of the supposed fact that they produced no chemic, phoritic, or, electrolytic action. Some experiments made in my laboratory may prove interesting. A few drops of a saturated solution of iodide of potash in glycerine was placed under the middle of a pane of glass. A current of high potential and high frequency was passed through the glass, decomposed the solution, and liberated the iodine. Then a solution of starch was placed under the middle of a pane of glass and a solution of iodide of potash in glycerine was placed immediately over it on the upper surface of the glass. A high-potential, high-frequency current was passed through the iodide solution through the glass, for about five minutes. At the end of that time there was a decided iodine reaction in the starch on the under surface of the glass. The glass was pasted to white paper, with starch around the edge. No reaction took place at the edges.

Reported to the Medical and Surgical Society of the District of Columbia, March 5, 1903.

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

Ureter-Catheterism: Its Purposes and Practicability. Bransford Lewis, *Annals of Surgery*, Philadelphia, January.

There is a difficulty of diagnosis between hepatic and renal calculus; a differential diagnosis may be made after catheterizing the ureter. The paper is accompanied by history of cases and radiographs.

The Use of Morphine in Uræmic Convulsions. A Symposium, *Therapeutic Gazette*, Detroit, January 15.

This is a tabular statement of opinions of authorities in response to questions made by the editor of the *Therapeutic Gazette*. A majority are against the morphine, especially in interstitial and chronic nephritis. In acute cases it may be given in small doses. However, there is some diversity of method.

Improved Treatment of Chronic Follicular Urethritis. Geo. L. Eaton, Occidental Medical Times, San Francisco, January.

The method of the author of this paper is the use of a cannula 20 cm. long, No. 20 Fr. curved at the end, so that it will reach the opening of the ducts. He irrigates the urethra, and then applies through an endoscope a fifty per cent. solution of peroxide of hydrogen directly to the follicles. Then he irrigates again, reintroduces the endoscope, and applies a five per cent. solution of albargin. Next comes another irrigation with a normal salt solution.

This is a complicated method, and it is a question if every irritable urethra will endure so much instrumentation in one séance.

Albargin, or Gelatose Silver, in the Treatment of Gonorrhea.

H. G. Klotz, Medical News, New York, November 29.

This new preparation, which contains fifteen per cent. of silver, is another rival of nitrate of silver. It is used as an injection, like argonin and protargol, and has less irritating properties. It may be used as an injection with distilled water up to a ten per cent. solution. It kills the gonococci as far as it can reach them without causing any complication in about twelve days. From records taken we find that cures were effected in from five to twenty-four days when used as an injection; each time holding it in the urethra five minutes. In about ten per cent. a posterior urethritis was developed.

[We advise having this remedy used as a gelatine urethral bougie, as Mitchell in Philadelphia prepares it, to be inserted in the urethra, where it may be kept an hour or longer. The preparation is antiseptic and antigonorrheic, and is imported from Germany by Victor Koechl of Hudson Street, New York.]

The Relation of Gonorrhea to Tuberculosis of the Genito-Urinary Tract. By Daniel N. Eisendrath, M. D., Chicago Medical Recorder, December 15, 1902.

Eisendrath offers the following conclusions from his study of the cases here reported and the literature:

1. That in patients suffering from an acute gonorrhea, there may be an almost imperceptible transition into a malignant type of tuberculosis.

2. That subacute or chronic gonorrhea may mask the presence of a tuberculosis. That these, as well as the acute form, may act as predisposing, and even at times as exciting, causes of tuberculosis.

3. In patients who show evidence of local complications of

gonorrhea, such as prostatitis, vesiculitis, cystitis, or epididymitis, one should always bear in mind the possibility of tuberculosis, and examine the urine for tubercle bacilli, if antigonorrheal treatment causes no improvement.

4. In patients with marked tubercular history, an attack of gonorrhea should be carefully watched, and the prognosis be guarded.

5. Gonorrhea, both in the male and female, often prepares the soil for a later invasion of the tubercle bacillus.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Foreign Bodies in the Esophagus.

The following report of the case of a foreign body in the esophagus successfully removed by Dr. Russell S. Fowler (Brooklyn Medical Journal and American Electro-Therapeutic and X-ray Era) is of much interest:

The father of a child, while playing with her, allowed her to place a penny in the mouth, whence it quickly passed into the esophagus beyond his recovery. The parents, expecting the coin to pass, delayed taking the child to their family physician until four days later. The coin had not passed as expected, and the child suffered from inability to swallow solid food, regurgitation being immediate. Liquids passed more easily. There were slight coughing spells from time to time, but at no time was any blood coughed up. As the symptoms were not urgent, no attempt was made by the family physician to definitely locate the penny, he, at that time, believing it would finally pass downward. The child was seen again on May 8, a week after the accident, by which time she had begun to grow somewhat thin and pale. Liquids were easily swallowed and solids fairly well. This was probably due to a slight change in the position of the penny. At Dr. Fowler's suggestion a radiograph was taken by Dr. Bender April 10. Chloroform was administered to keep the small patient quiet. Previous to the taking of this picture swallowing had improved so markedly and suddenly that the parents were disinclined to have anything further done. The fluoroscope examination of April 10 showed the coin vertically placed in the esophagus at the level of the sternal notch. The plane surfaces were antero-posterior, forming a partition on either side of which food could pass. The transition from difficult to easy deglutition was probably caused by the penny swinging into its vertical position. At no time in the history of the case was there any complaint of pain.

On April 10 the X-ray apparatus at the German Hospital was utilized, with the patient under chloroform, to again locate the penny. Its position had not been altered. Dr. Bender assisted at this procedure. Owing to the small size of the patient's pharynx and esophagus there was a delay of a few minutes in selecting an appropriate coin catcher. The one found applicable to the case was of slender whalebone, with a small, double swinging basket of silver. This instrument was passed with difficulty, though no force was used. With the fluoroscope the coin catcher was delicately passed to a point several inches below the penny. During this maneuver the child was flat on the back and deeply anæsthetized. With the penny and the coin catcher both in sight, the instrument was gradually withdrawn, during which process it could be plainly seen to engage the penny and carry it along the esophagus to the pharynx. As the point was reached the child's head was lowered and the coin catcher and its imprisoned penny withdrawn. Length of anæsthesia, 15 minutes. The subsequent history of the case is uneventful. The child was kept on fluid for a few days and began her usual diet. No bad after-effects of any kind were noted.

While it is not safe to draw too many conclusions from a single case, the following suggested themselves: (1) The desirability of complete anæsthesia before attempting to remove foreign bodies from the esophagus. (2) Instruments for introduction into the esophagus of children should be more flexible than those intended for use in adults. (3) The patient's head should be lowered as the coin is seen to approach the pharynx in order to avoid its dropping into the larynx. (4) Instrumental exploration with the aid of the fluoroscope should precede any operative attempt. (5) Exploration must be very delicately done to avoid injury to the esophagus.

The Mastoid Operation.

In deciding the necessity for a mastoid operation, Braislin (Medical News, December 27, 1902; Journal American Medical Association, January 10, 1903) says that the symptoms of greatest significance in leading one to undertake immediate operation are:

1. Pain continuous and severe, making sleep impossible, and radiating upward along the side of the head to the vertex, backward to the occiput, or, more rarely, forward to the frontal region.
2. The temperature, even in children, does not often keep at a high point after the first days of acute illness, but is often markedly irregular.
3. A falling of the posterior superior wall of the external auditory canal. This is caused by œdema of the periosteum and tissues over the mastoid cells or may be due to the actual burrowing of pus. It is possible to mistake this condition for furuncle of the canal and *vice versa*.

4. Tenderness over the mastoid is the rule in cases calling for operation, but there are exceptions. Other severe symptoms may be present pointing to perforation of the tegmen tympani.

Some operators go to the extreme of believing that an exploratory mastoidectomy is justifiable at any time, but Braislin thinks that many of these cases would recover without operation, and conservatism would be preferred by most of us as applied to our own mastoids. He thinks it is proper to operate on cases in the quiescent chronic state to prevent destructive processes and further serious consequences.

Stacke's operation can often be done in this condition with benefit, and with a shorter convalescence, but the lack of pain or serious subjective symptoms often prevents permission to operate.

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

The actinic rays, their use in minor surgery, is discussed by Edward A. Tracy. He refers to the progress made with the Roentgen rays in the six years that have elapsed since their discovery as little short of marvelous, and points out that rays far older than the X-rays have more recently begun to be investigated.

Dr. Tracy's investigations have been carried on especially to demonstrate the power of the actinic or ultra violet rays to produce skin anæsthesia, as first suggested by Minim of St. Petersburg, and which has been reported in this department. Tracy uses the Minim lamp, and reports three cases of minor surgical operations done under actinic ray anæsthesia.

Case 1.—Removal of large sebaceous cyst (an inch in diameter) from the scalp, without pain.

Tumor was of five years' duration. A fifteen-minute application with a No. 1 Minim lamp was made at a distance of ten inches. Two incisions, each an inch long, were made through the skin over the tumor, the incisions meeting, and an elliptical-shaped piece of skin removed. The cyst was then shelled out with a curette and four running stitches taken. The patient felt no pain. A ten-minute application of the actinic rays was made for their antiseptic effect. A piece of adhesive plaster was then applied over the stitched surface. This was removed the following day. The cut tissues were reunited. A fifteen-minute application of the actinic rays was then made to facilitate healing. No dressing of any kind used. Reapplied on the third day. Stitches removed, which were clean. As no pressure had been applied on the first day, blood flowed under the united skin flaps, causing them to bulge upwards. On the second day Tracy broke open the united surfaces to determine the nature

of the contents, which proved to be, as was suspected, a blood clot. On the fifth day this clot was almost absorbed.

Case 2.—Subcutaneous abscess, size of marble, opened under actinic ray anæsthesia and treated with actinic ray antisepsis. Anæsthesia was produced by a ten-minute application from a No. 1 Minim lamp. The abscess was incised and one-half a dram of pus pressed out. The pain was trifling. The rays were applied ten minutes more and the wound bandaged, without other dressing. The actinic rays were applied from a No. 2 Minim lamp, on the second and third days, respectively, for fifteen minutes. The patient went to work on the third day.

Case 3 was removal of a skin slough an inch square from the surface of the palm under actinic ray anæsthesia, and treated in the same manner as the cases detailed. Healing took place in two days, save where the cotton dressing adhered. Treatment on the third day was followed by complete healing, and no further attention was required.—*Boston Med. and Surgical Journal*, November 6, 1902.

[Remark.—The above article has been reported in detail because the field of actinic ray anæsthesia has been but little investigated, and the results obtained by Minim and repeated by Tracy are of such a nature as to render further investigation of interest. There is every reason to believe, both on physical grounds and from clinical observations, that etheric vibrations, whether of the frequency to produce light, or an electric current, are capable of analgesic and even anæsthetic properties. These observations are a matter of record, with alternating currents of high-frequency, and have occurred in the writer's experience in the use, not only of the ultra violet light, but with the current of tension from the secondary of an induction coil, and also from a high-frequency of the sinusoidal current. The most interesting and convincing experiments with the sinusoidal current were made by Prof. Scripture of Yale, and reported to the American Association for the Advancement of Science several years since. His experiments were made with a Kennelly alternator. A frequency of 5000 complete periods per second, 10,000 alternations, was made to traverse a nerve with the result of cutting off sensory communication by this nerve, and needles were run into any part of the body supplied by the nerve without pain being felt. Groups of nerves, for example, the brachial plexus was cut off in a similar manner. The analgesic and anæsthetic effects of currents of high frequency are the same in kind as those produced by light. The agents differ only in rate and wave length.]

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Roentgen Ray as a Therapeutic Force, from a Clinical Standpoint, with Illustrative Cases.—John B. Murphy, A. M., M. D., Chicago, Ill.

In speaking of the diagnosis and treatment of tuberculosis of the joints, he said: "To-day the X-ray informs us just when we are dealing with a case of primary synovial tuberculosis, where we have hydrops of the knee joint, where we have a tuberculosis of the synovial membrane only, and we inject that case with the emulsion of formalin, iodoform, and glycerin, and the patient goes on to recovery without interruption. When we have a case of the type where the disease has not yet ruptured into the joint, and where the joint involvement is merely an effusion without any communication with the lesion in the bone, there is practically no relief whatever, and we should not expect any, from the injection of fluids into the joint, because they do not come in contact with the primary tubercular lesion which is situated in the bone.

The X-ray is not only an aid in making a differential diagnosis in these cases, but it is also an aid as a therapeutic agent in tuberculosis of the bones and joints. I have had a very gratifying experience with it in two cases of tuberculosis of the knee joint involving the synovial membrane. They were injected without producing the desired effect. The X-ray was then used, and one case, in which the effusion had existed for nine months, was discharged from the hospital twenty-one days after admission without a particle of effusion or the slightest diminution in the range of motion of the affected joint. I never got such a result before where I simply injected the mixture of formalin, iodoform and glycerin. By putting on the X-ray and stimulating the production of new tissue, as we know the X-ray does, there was almost immediate restoration of the synovial membrane to its normal functions of secreting and absorbing, so that there was not a particle of retained effusion in the joint.

Not alone in this type of tuberculosis of bone has the X-ray shown its striking features, but I also have three cases of tuberculosis of the spine in which its use was followed by the most striking and gratifying results. Tuberculosis of the spine is frequently accompanied by a paraplegia. That paraplegia has heretofore been attributed to the kyphosis and the compression produced at the point of bending. Now we know that it is not the deformity of the bone at all that produces the paraplegia, and that the compression occurs in the posterior portion of the cord, and not the anterior, as would

be the case if the bending was the cause of the trouble. When the tubercular condition ruptures through the compact bone it forms a granuloma within the spinal cord, and it is this granuloma that produces the compression of the cord and the paraplegia in the parts affected.

The question came up in Victor Horseley's citation of his cases of tuberculosis of the spine. He went in behind this granuloma, curetted the body of the vertebra, doing a laminectomy, opening not the dura but the spinal canal. He made a curettement and in that way relieved the pressure. I have done that operation for the relief of pressure three times, twice with good results and once with a failure. It was this particular case in which the operation failed to give the expected relief, that led me to the use of the X-ray for its therapeutic effect in just this class of cases. You will pardon my citing a case, but I cite it because it is a forcible one in illustrating the use of the X-ray in this very hazardous lesion; hazardous, because it hinders walking.

The patient, age 36, a farmer, was lifting a hog from a sling when he suddenly felt a pain at about the fifth dorsal vertebra. The pain gradually increased in severity, although he was able to be about for a week. I saw him 38 days after the accident, as he called it. He said that he did not fall down when he had the pain, nor did he drop the hog, but he carried it to the place in which he had originally intended it to be. When I first saw him he had a beginning paraplegia from the point of the injury down. I could not believe that a tuberculosis of the spine originating in an adult could advance with such rapidity as to produce a granuloma sufficiently large to compress his cord in that short period of time. Consequently I made a diagnosis of sarcoma. Besides we know that an osteosarcoma following trauma can develop with that rapidity.

With a large hypodermic needle I made a lateral puncture in between the ribs, through into the pleural cavity and into the body of the vertebra and succeeded in getting a drop of pus and tubercular débris. Dr. John Deaver, of Philadelphia, who was in Chicago at the time, saw the case with me and confirmed the diagnosis. The next question was,—what could we do for that man other than to do a laminectomy to step his rapidly advancing paraplegia. After a thorough consideration of the subject I decided to put him on the X-ray treatment. The first few days after its application his paraplegia continued to get worse. After the third application of the ray his pain disappeared, and after twenty-five applications his paraplegia had entirely disappeared and he was able to go home, and to show you how thoroughly it disappeared, he went hunting, shot chickens and incidentally shot off a part of his foot. I used the X-ray to hasten the healing of his foot.

The second case was one on which I had performed a laminectomy a year before. There was absolutely no improvement, in fact, he was worse after the operation than before. There was already a mixed infection at the time of operating. There had been a number of discharges of fragments of bone in the year that had elapsed. I curetted, but without any result, and I finally put him on the X-ray to heal his bone tuberculosis. Twenty-one applications of the ray closed it up, so that instead of having a rather profuse discharge there now was none. It did not help his paraplegia nor did we expect that it would, because his cord had been destroyed by the tuberculosis and the mixed infection which had been present from the beginning.

The third case was a patient, paraplegic, suffering intense pain, taking one-third of a grain of morphine every two hours to secure partial relief, on account of the increasing pressure of the granuloma on his cord. He was unable to move and was confined to bed all the time. He was put under the X-ray. The first two applications, and that is one of the peculiarities of the X-ray, stopped his pain, and although it did not remove the tumor, yet it stopped its rapid growth. I received a report from that patient to-day. He has had twenty-three applications of the ray and is now walking about on crutches. From the second day of the application of the ray he has not had a hypodermic of morphine. I think, I can safely say that the prognosis in this case is exceedingly good." * * *

The question of the treatment of malignant disease with the X-ray is one that concerns us most. I believe that that is the one condition where we had hoped that the X-ray would come to our rescue. Surgeons are generous people, and they would gladly give all the malignant cases to anyone who could hold out a single ray of hope. The X-ray has not, however, been without some result. I have brought a slide taken from a specimen that was very instructive to me, a case of very large carcinoma of the breast. The tumor appeared to be about as large as an ink-well and was covered by the skin and surrounding tissues. The patient was a very old lady, and as I considered the case an inoperable one, I referred it to Dr. Wm. Allen Pusey, of this city, for treatment with the X-ray. It was really remarkable to see the rapidity with which the size of that tumor diminished. After about twenty-one or six applications, the patient had an attack of gastritis, which persisted until she finally succumbed.

We succeeded in recovering the specimen of the tumor and it was very instructive. First, because of the fact that the ray reduced the size of this large mass to one two and a half centimeters wide and four centimeters long. Second, because of the changes in the tumor itself. We sectioned it and when

we came to examine the microscopic specimen, we found that the changes were of two kinds. First, an increase in the connective tissue; second, a decrease in the cellular elements of the carcinoma. The connective tissue stroma became enormous in proportion to the cellular elements, but still the shape of the cells in their various epithelial pockets did not appear to be changed. It did not show that there was any strangulation of the cells by the contraction of the newly-formed connective tissue, and yet there were changes in the cells. The protoplasm had undergone a change. The cells showed vacuolization, but the nucleus did not seem to have changed. It seemed to be the part of the tissue which was the least affected. Now it has been our belief for a long time that in the repair of carcinoma the X-ray acts by destroying the cell, or by an impression produced on the cell which prevents the regeneration of cells of the same type. The cells in this tumor were all changed in about the same way.

Another interesting feature in this case was the fact that the glands had not changed in the least through the application of the ray. They were typical carcinomatous glands, and even the gland just outside of the breast, which must have received the full force of the ray, was not affected by it in any way. That is an important feature the interpretation of which time will have to clear up.

This was the most pronounced effect in a deep lesion, that is, a lesion beneath the surface of the body. We have had in Mercy Hospital cases of typical carcinoma that were not affected by the X-ray. We have also had considerable experience in cases of deeply-seated carcinoma of the intestinal tract without any pronounced effect. Of cases of superficial epitheliomata I distinctly recall one case of epithelioma of the eyelid which was entirely healed, one of the most perfect repairs I have seen.

We have not even learned, however, in treating lupus with the X-ray just what class of cases are going to get well and those which are not. I remember one case we had in Mercy Hospital that did not get well. In fact, the disease continued to develop and new foci appeared and continued to form right during the treatment. We subsequently treated the case by a plastic operation. We will learn the differential part of this work when we become a little more familiar with the disease. In the treatment of the deeply-seated carcinomata we must learn to change the tension of the tube, either increase or lower it. It seems to me that if we have a force in the X-ray that can aid us on the surface, that we should in some way get the same effect on the deeper lying tissues.

There is another field of usefulness for the X-ray, one that has been but little cited in the literature, and that is the treatment of deep fistulæ, intestinal fistulæ. That is another class

of conditions that annoys the surgeon very much. I have had a number of them, and it is remarkable how quickly the X-ray will by stimulation increase the amount of connective tissue, and close the sinus. More work can be done along this line with profit to everyone, the practitioner as well as the patient.

THERAPEUTIC EXERCISE.

EDITED BY WATSON L. SAVAGE.

TESTING STRENGTH OF COLLEGE STUDENTS.

Much dissatisfaction has been expressed in the College Gymnasium Directors' conventions, held annually at the Christmas vacation, with the present method of testing the strength of college students. Various attempts have been made to eliminate the objectionable features and at the same time retain some form of strength index. The value of some method of comparing physical power is very apparent, acting, as it does, as one of the strongest incentives to physical exercise, which in turn favors preservation of the health and becomes a preliminary preparation for the more or less severe forms of athletics. Dr. Sargent has just published in pamphlet form a scheme for testing strength, speed, and endurance, by measuring, in foot-pounds, the amount of work that can be done within a given time by the large muscle groups in the body. One of the very interesting features is that the tests are various methods of lifting the body, or at least some part of it, and repeating the performance as many times as possible, requiring little or nothing in the way of appliances for making the tests. As the weight lifted is the body, there is no expensive machine necessary to register the lift. The foot-pounds are calculated by multiplying the weight lifted by the distance in inches and this product by the number of times the feat is performed, the final result being divided by twelve. The length of time taken to go through the exercise gives the result of pounds per minute, or speed. For example, in testing the strength of the biceps and back, we would first measure the length of the arm from the front of the shoulder to the end of the longest knuckle of the clinched fist, the student then grasps a bar, which is fixed at about thirty inches from the floor, with palms toward the face, hangs downward with arms stretched, body extended forward horizontally beneath the bar on a line

with the thighs and legs bent at such an angle that the feet are directly under the knees; from this position, he pulls the chest to the bar as many times as possible. He is lifting approximately half his weight a distance of the length of his arm according to the measurement just taken. Multiplying this weight, expressed in pounds, by the length of the arm in inches and then by the number of times the body is lifted, we have a product which we can reduce to foot-pounds by dividing by twelve. Other tests are made and calculated in a singular manner for the biceps and chest, abdomen, loins, thighs, and calves, the results being added together to give the total strength and endurance, while speed is indicated by dividing the total strength by the number of minutes consumed in taking the tests.

The advantages of this test over the old one would seem to be the more scientific method of calculation, the doing away with expensive dynamometers, the reduction in the degree of strain possible in any given test, above all, its equal adaptability to all ages and to both sexes, so that it becomes a universal and comparative test which may be used to correlate strength conditions of very diverse conditions of life. The most serious objection is the factor of time, half an hour being required for a test. In private practice, this does not seem a long time to devote to the examination of a patient, but when applied to schools and colleges where examinations run up into the thousands, it would require a considerable increase in clerical force, both to take the tests and to perform the large amount of calculation involved. It would seem as if much time could be saved if the doctor had employed the metric, instead of the English, system. I cannot understand why these tables are used, except upon the ground of popular understanding.

The working capacity of the body expressed in foot-pound units appears so great that slight increase in power under training is reflected in a gain of thousands of points. These large numerical gains due to the use of this system of calculation become a source of no little satisfaction to the pupil or subject taking the trials.

W. L. S.

The American Association for the Advancement of Physical Education will hold its next convention in Detroit, Michigan, on April 7, 8, and 9, and expects to have a very full meeting.

In the past, these conventions have been held once in two years and with one exception, and then in conjunction with the World's Fair in Chicago, they have taken place in the East. This association is the official head of all work in physical training in America, counting among its members many prominent men in applied and corrective gymnastics. In the past few years the membership of the society has grown so rapidly and its work has become so extensive that it is planned to divide the convention into sections, which, in fact, was done at the convention two years ago. This has been found necessary in order to give time for all the papers to be read and discussed with profit. The sections as now proposed will be anthropometry, elementary schools, secondary schools and colleges, and normal schools. A section on corrective and medical gymnastics has been talked of, but not as yet favorably considered. The meetings are open to the public at all times and attendance is invited.

THERMOTHERAPY.

EDITED BY CLARENCE EDWARD SKINNER, M. D., LL. D.

Superheated Air in Rhinology.—L. Sverzhewsky, in *Medizinskoe Obozryenie*, Moscow; Jour. A. M. A.

In 40 patients with various affections of the throat and nose, 25 were cured, 2 improved, and no results could be determined in 13, all treated by the application of superheated air. It proved most effective in cases of acute and subacute coryza, swelling, and hypertrophy in the throat, gumma breaking down, in ozone and in neuroses. It did not prove effectual in atrophic processes, nor in cases of hypertrophy of the nasal passages.

Lang's Hot-Air Apparatus. Jour. Am. Med. Asso., October 4, 1902.

Spitzer reports the results of treatment of thirty-two patients with lupus by the application of superheated air. Lang uses for the purpose an ordinary Paquelin provided with a curved, conical cap open at the tip. Air is forced into the cap heated by the thermocautery and projected from the tapering cap in a fine stream. An asbestos ring protects the operator's hand from returning hot air. The air is supplied by two rubber bulbs squeezed alternately, so that the supply is continuous. The burns thus induced were not accompanied by the general symptoms of ordinary burns. Albumin never appeared in the urine and the general health showed no disturbance. The instrument has been used during the last year and one-half and was applied forty-five times. The short course of the treatment, the fine soft scars,

its applicability to extensive surfaces, its ready use by any general practitioner, and especially the fact that recurrences seem to be less frequent after it than after any other method, commend it for general adoption. The small instrument can be manipulated as easily as a pencil. The burned patches heal over in less than half the time than after Paquelinization. By the third day a resorcin salve can be substituted for the moist compresses applied at first. This treatment has proven particularly effectual in old cases with elephantiasic indurations.

DIETETICS.

EDITED BY SIGISMUND COHN, M. D.

The Dietetic Treatment of Tuberculosis. By William Henry Porter, M. D. New York City, Medical Electrology and Radiology, January, 1903.

According to the author a clear knowledge regarding the requirements of the normal economy is necessary in order to understand the dietetic management of a diseased system. A careful study of the chemical composition of the foodstuffs used, their digestibility, the percentage of each absorbed, and the ease with which they are utilized by the system, is necessary. In addition we have to consider that the relative proportion of the foodstuffs as starches, fats, and proteids is adjusted rightly to the requirements of the system, and for this reason some definite standard diets have been established by which the quantities of proteids, fats, and starches required daily are determined. Such standard diets have been made up by different authors, as Rubner, Koenig, Atwater, and others. But they all fail to meet the one requirement, that is to keep within the limits of the oxygenating capacity of the system. Therefore the author undertook to establish his own dietary standard. He cannot emphasize too strongly that it is in this law of oxidation, when correctly applied, that we have the true and only secret of health and its restoration if for any reason it has been impaired. This is especially true in connection with pulmonary tuberculosis.

The dietary standard made up by the author is as follows :

150.00	grams	(5.32	ozs.)	proteids.
104.55	"	(3.67	") fats.
137.33	"	(4.84	") glucose.
27.47	"	(1.03	") mineral salts.
<hr/>				
Total,	419.35	"	(14.86	")

Comparing this dietary standard with those of other authors we see that it contains a relatively smaller proportion of

carbohydrates while there is an excess of proteids and fats, but it keeps within the limits of the oxygenating capacity of the system, but its potential energy is = 2150 calories, which is insufficient.

Taking now the foodstuffs and composing them into an actual diet, the author is in favor of a mixed diet, i. e., the animal as well as the vegetable kingdom should be employed. Only the proteids should be taken chiefly from the animal kingdom because the animal proteid is more easily digested and a larger percentage is absorbed, but a certain proportion of proteids the author wants to be taken from the vegetable kingdom on account of the animal proteid being defective in the nucleo-albumin compounds. This idea of the author's is erroneous, as exactly the opposite is the case. I have already mentioned this in a former review of another paper by Dr. Porter (Vol. XX., No. 11, pp. 757, November, 1902, *Journal of Advanced Therapeutics*).

The author now gives us a sample diet. An ideal mixed diet:

Breakfast. Two eggs, 8 ounces of milk, 2 ounces of wheat bread and butter.

Midday meal. From 1-4 to 1-2 pound of beefsteak, 8 ounces of milk, 3 ounces of bread and butter.

Night meal. From 1-4 to 1-2 pound of beefsteak, 8 ounces of milk, 2 ounces of wheat bread and butter.

Bedtime. Eight ounces of warm milk.

Of course this diet can be modified at times according to the taste of the patient, or owing to special idiosyncrasies. Instead of beefsteak other meats can be taken, as lamb, mutton, veal, or fish, or oysters, clams, poultry, and game. Only we have to take care that the foodstuffs are easily digestible, because the real difficulty in the treatment of a tuberculous patient is the pronounced loss of appetite and the enfeebled digestion which make it sometimes impossible for the patient to digest the necessary amount of food to maintain life. But there is no other method by which these results may be secured. To crowd the food beyond the power of the digestive system to digest it as Dr. Debove did by forced feeding is doing more damage than good.

Finally the author comes to the following conclusions:

(1) The chief problem in the dietetic treatment of tuberculosis is first to overcome the general malnutrition, and next to establish a higher grade of local nutrition at the infected foci.

(2) The composition, digestibility, and percentage absorption of the various foodstuffs and the oxygenating capacity of the system are accurately known.

(3) By this knowledge the quantity of food taken can be accurately adjusted, so that the full heat production and constructive utilization of the proteids is secured.

(4) The oxygenating and carbon dioxide excreting powers of the system must not be exceeded if the best results are to be secured.

(5) By following these accurate laws systematically a perfect diet can be arranged, and the abnormal and pathological conditions can be changed to the normal, physiologically speaking.

(6) The most difficult problem to contend with in the dietetic management of tuberculosis is the loss of appetite and the inability on the part of the system to digest and utilize perfectly a sufficient quantity of proteid material to maintain life and at the same time repair the damage already wrought.

(7) When this is accomplished, a large percentage of tuberculous patients are rapidly and permanently cured, more so than by medical treatment or simple climatic changes.

(8) A universal adherence to these laws through a century, might result in a complete eradication of tuberculosis from the human species.

On the Influence of Boric Acid upon the Metabolism of Man.

By M. Rubner, *Hygienische Rundschau*, 1902, No. 4.

Boric acid, which is generally added as a harmless preservative to the different foodstuffs, has proven to be, according to the investigations of Rubner, a substance which actually influences the various functions of the body. Rubner could confirm the prior observations of Foster that the utilization of food is impaired by the addition of boric acid. Besides he found a considerable increase in the production of the calories, the elimination remains the same, but the CO_2 elimination was increased. Therefore the loss comes from the non-nitrogenous foods. Simultaneously a greater elimination of vapor was observed during the time the boric acid was present in the system. As boric acid exercises such a marked influence upon the decomposition of fats, it ought to be classed among the harmful mediums. It is possible that boric acid may yet be used as a fat reducing remedy.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

Let Us Make an End of Popular Hypnotism.—Editorial Note in *American Medicine*, February 27, 1903.

We never had much faith in it, even in the hands of experts. Even Charcot, it would seem, could have been better occupied than with this neurotic nonsense. When all the reports of physicians are gathered and analyzed, if the analyzer is a cool and scientific man he will prefer to drop the whole affair with

a smile of disdain. If he observes the vogue of the ignorant "professor" and the popular lecturer upon the subject he surely will conclude that public exhibitions and money-making by means of hypnotic practices should be absolutely forbidden by law. Few know the extent to which the abuse has grown, and the flood of literature advertised in the cheap magazines and the crazy journals. It all has a sham philanthropic ring, there is much jibbering of "self-development," "power," etc., but, closely observed, one finds that it is all erotic, neurotic, or tommyrotic. If there is any truth or power in it, it is dangerous to put such power in the hands of the ignorant and designing. The newspapers have reported a number of cases of criminal abuses by country charlatans.

By all means, let us make an end, not only of "popular hypnotism," but of the unskilled use of every other agent designed to affect the human body. But how is our palpitating and brilliant editor going to do it? As for *laws*, we have more of them now than public sentiment will sustain, or than we are able to enforce. Besides, you cannot regulate all human conduct by the machinery of law.

So far as his appeal refers to popular hypnotism, employed merely for the amusement or entertainment of audiences, there is no just ground for dissent. When, however, he intimates that there is nothing in hypnotism or a modification of it, of value as a therapeutic agent, he is inviting the progressive scientific spirit of the age to "go away back," and perhaps to "sit down." Charcot, great as he was in other directions, did not greatly add to his fame through anything he said about or did with hypnotism. His assumption that only hysterical or temperamentally abnormal people could be hypnotized, was narrow and erroneous. Its falsity has been repeatedly established. But even the little that he did for hypnotism brings him under the lash of the editor of *American Medicine*.

All this sounds so familiar to our ears! It was said about electricity not so many years ago. If the editor in question was born, medically, then—he commenced to write at birth—he probably wrote some uncomplimentary things about "popular electricity," and doubtless wanted to "make and end" of it, too. It is a pretty large "end" now, and growing still larger all the time. The psychic treatment of disease, whether with or without formal hypnosis, is going to "end" just as electrotherapy is ending at the present time.

No, Mr. Editor, the roar of the incoming wave may disturb the serenity of your repose, but it will not stop its activities at the behest of bumptious appeals or commands. You had better change the location of your room and get further away from the noise.

There is an easier, as well as a more logical, way of checking popular movements going on *outside* the profession. Bring them *inside* the profession far enough to permit it to investigate, analyze, appropriate, and utilize whatever of merit they possess. Then the "popular" feature will speedily die a natural death. Nothing is ever destroyed or materially changed, except as its growth is thereby stimulated, by sneers or bumptious ridicule. Some causes, as well as individuals, are fortunate in the enemies they have made.

M. F. P.

MECHANICAL-VIBRATION THERAPY.

EDITED BY LUCY HALL-BROWN, M. D.

THE treatment of diseased conditions of the human body by means of mechanical vibration, now coming rapidly into popular favor, is not, as respects the suggestion of its application, really a new method. The recognition of a broad, and, it is believed, a comprehensive and correct theory for its application, is what may now justly be claimed for this very effective modality for the relief and cure of disease. Its results, thus far, have been highly gratifying, with greater promise of success in the impending future.

The idea (for it could hardly be said to have attained to the dignity of a principle) of treating disease by means of mechanical vibration is, as already intimated, probably as old as the therapeutic employment of the electric current. Many years ago, instruments, all of them more or less crudely conceived, were manufactured and attempted to be introduced for this purpose, but failing to favorably appeal to the profession, their sale and use was consequently very limited.

At the International Congress of Electro-Therapeutics, held in Paris in July and August, 1900, six instruments were on exhibition, all of them designed for the application of mechanical vibration to the body. It is apparent, therefore, that the idea of treatment by means of mechanical vibration has been vaguely

entertained in the minds of our professional colleagues on both sides of the water for many years.

The Vibratory Fork of Boudet, of Paris, was exhibited at the International Congress, and the claim was made in its behalf, that it was the first practical machine of the kind ever offered to the profession.

The Vibratory Handle of Dr. Garnault, consisting of a hollow handle, inside of which was a tiny motor, on the shafts of which was mounted an eccentric, was also exhibited, with attachments for the ear, nose, etc.

Another instrument shown at the Congress was the Vibrating Cap of Drs. Gilles de la Tourette, Larat, and Gautier.

An instrument called the Hand Vibrator was also exhibited, but it possessed no special merit.

There were also on exhibition two instruments, one small and one large, known as the Vibrating Table of Drs. Charcot and Gilles de la Tourette. Both these instruments were constructed with a view to imparting vibration to the entire body. The patient was seated in a chair on the table, which was then set in vibratory motion. It was in the offices of Drs. G. Gautier and J. Larat, in Paris, the eminent French electro-theraputists, that I saw in operation a mechanical vibrating instrument. Those gentlemen were using it in conjunction with electrical treatment.

A full description of the mechanism of the six instruments above referred to, may be found in the Transactions of the International Congress of Electro-Therapeutics, 1900, pages 424 to 430.

But, as before remarked, none of these instruments were constructed with reference to any very definite principle to be pursued in the treatment of patients. All that could be hoped for from their use was whether benefit might accrue from a general invigoration or "shaking up" of the nerves and muscles of the body. Such instruments would not at all meet the demands of the mechanical-vibration therapy of to-day. What is now required is some device whereby a deeply penetrating stimulation may be effectively applied to a nerve or nerve-center that controls diseased organs, which are located mainly in the spinal and sympathetic systems. This, briefly stated, is substantially what we understand to-day by mechanical-vibration therapy.

It logically follows that in order to be effective the treatment must be localized over the nerve area which governs the diseased or abnormally acting organ or organs. Except when stimulating secretion, excretion, and drainage (through the lymphatics), it should ordinarily be restricted to these areas. Unless there is a clear indication for it, as disclosed by sensitiveness to pressure, the other and unaffected nerve areas should not be vibrated.

But it cannot be expected, nor is it proposed, in assuming the editorship of this Department, to enter upon an extensive elucidation or explanation of the theory or technique of mechanical vibratory treatment. Those who may be interested to pursue the subject in further detail, are recommended to read the excellent work recently published on "Mechanical Vibration" by the Metropolitan Publishing Co., 112 Chambers St., New York City, written by Maurice F. Pilgrim, M. D., Professor of the Chair of Psychiatry in the New York School of Physical Therapeutics. This is the only work thus far published that treats fully of the theory and practice of this therapy in an orderly and systematic manner, and which correctly states its basic principles. These principles must be recognized and adhered to in order to obtain the best results of which this therapy is capable.

It will be the aim of the editor of this Department to supply from time to time such extracts from published clinical reports, as well as unpublished reports from practitioners, as will show what is being accomplished along the line of mechanical vibration therapy in the treatment of disease. It is hoped thus to make this new department both interesting and instructive, and a source of practical assistance to physicians in their laudable efforts for the relief and cure of disease.

SOCIETY MEETING.

Stated Meeting February 20, 1903. William Benham Snow, M. D., in the chair.

DRY SUPERHEATED AIR IN THE TREATMENT OF SEPTIC INFECTION.

Dr. Clarence E. Skinner read a paper on this subject, of which the following is an abstract:

He divides cases of septic infection into three classes, for the

purposes of thermotherapy; first, those in which the infection has taken place in a limb, and has not yet invaded the lymphatics of the joint connecting the member with the trunk, and which are nearly always early cases; second, those in which the lymphatics of the trunk have also become involved, but where the original focus of infection has not yet become so profoundly infected as to demand removal; and, third, those in which the lymphatics of the trunk are involved and the tissues originally invaded are so hopelessly diseased as to demand immediate operative interference.

In the management of cases belonging in the first category, the local hot air application is usually sufficient, but for those of the second and third classes the body application is required, because of the necessity for large eliminative and strong general tonic effects.

A case was cited, as illustrative of the beneficial power of hot air in the first-mentioned class, of a young woman who had pricked her finger with a fork. Septic infection developed, and when she came under treatment three days afterward, the finger, hand, and wrist were badly swollen, red streaks followed the lymphatic vessels nearly to the elbow, and the glands about this joint were palpably enlarged. She was given a local hot air treatment at once, with immediate and entire relief of pain, and she slept that night for the first time in thirty-six hours. During the next five days she received eight local hot air treatments, and at the end of that time was discharged cured.

A case illustrative of the second class of infections was that of a man thirty-two years old, who had cut his hand with a dirty jack-knife. When he came under treatment he was profoundly prostrated, temperature 103.4° F., hand and arm swollen, lymphatics about the elbow and in the axilla enlarged, and deeply located suppuration in the latter situation was suspected. During the next five days he was given four body hot air treatments, which produced remarkable improvement in the general condition and removed all of the local pathology except in the axilla, where a focus of suppuration was then demonstrable. This was incised, a large quantity of fluid pus evacuated, and a pocket discovered running up under the clavicle for a distance of about three inches, and large enough to admit of exploration with the forefinger. This cavity was lined with an enormously thickened pyogenic membrane, and no glands outside of it were involved in the infective process, which exemplifies the capacity of hot air treatment for localizing an infective process through its power of stimulating the vital resistance of the tissue cells contiguous to the abscess. The subsequent progress of the case was uneventful, and he was discharged cured three weeks after his first hot air treatment.

An instance exemplifying the third class of cases, was that of a man who had sustained a traumatic amputation of the left

foot at the ankle in a railroad accident. The injured member was amputated at the lower third of the leg on the day of the accident, and profound sepsis, with sloughing of the stump, developed during the following week. His condition grew steadily worse, and two weeks after the first operation it was decided to amputate again at the middle of the thigh as a forlorn hope. The administration of body hot air treatments was begun the following day, and during the following month he was given thirteen treatments. His general condition began to show slight evidences of improvement at once, and he was discharged cured, two months after the accident. The gravity of the case is indicated by the fact that the physicians in attendance were unanimously of the opinion that neither the second operation or any other ordinary remedial measure would save the patient's life, and that slight evidences of tissue disintegration appeared in the wound three days after the operation.

The physiological actions of local and general applications of hot air were set forth exhaustively, in so far as they bore upon the therapeutical relation of the agent to septic infection. The evolution and pathology of septic infection were then described, and the *modus operandi* of the curative influence of dry hot air in this condition, together with the rational indications for its employment, were elucidated by comparison with the physiological action.

Dr. Skinner does not believe that any danger need be apprehended, of transforming a local infection into a general one through the use of hot air treatments. He has administered thousands of these treatments to various cases of local pathology, and has never seen the slightest reason to believe that such a result was ever attributable to hot air. He finished his paper as follows:

"In conclusion, gentlemen, permit me to say that although dry hot air in the treatment of septic infection is a 'good thing,' yet it is not invariably a 'dead sure thing.' Side-lights, in the form of individual idiosyncrasy on the part of the patient, or variations in the inherent malignancy of different instances of even the same types of infection, will sometimes flash across the scene with an intensity sufficient to embarrass most seriously the exercise of a satisfactory influence on the part of any curative agent. It will, alone and unaided, cure many cases; others will require all the remedial resources at our command; and, in still others, all that we have will not suffice to produce a cure. It is simply a rational curative measure, exhibiting a known and constant physiological action, and which, either alone or in combination with other agents, manifests the capacity to increase vastly our power to overcome this condition in the majority of cases. It is, therefore, entitled to a prominent position in our armamentarium."

Dr. Robert Newman: I do not feel able to discuss this paper,

but I should like to make a few introductory remarks. I do not think dry air alone will cure a septic condition; it is rather the judicious management indicated by the reports given in the paper that gives the good results. In the first case, for example, eight treatments with hot air were given. Others perhaps would have given only two or three, and if the method had not proved successful the cry would have been raised that it was of no value. We have heard on good authority that the bite of snakes, and particularly of the rattle snake, is cured by the drinking of whisky. Will not the combination of whisky with the hot air treatment be more likely to yield good results? In some septic conditions it is very hard to accomplish anything by treatment. I have had some cases of salpingitis in which sepsis has arisen, and I do not see how the hot air treatment in such cases can be of avail. I am inclined to think that operation alone will prove of value, though we should all be glad to learn that when pus is hidden in inaccessible cavities we can control sepsis without surgical intervention. If the sweating induced by the hot air treatment does good, it occurs to me that it might be of advantage to aid the treatment by the administration of pilocarpin. The reader of the paper referred to Dr. Barrows' treatment of sepsis by means of formalin, but Dr. Barrows unfortunately had only one case, and it takes more than this number to warrant the drawing of trustworthy conclusions. Others have employed this treatment, and their patients have died, or have not been cured.

Dr. Skinner: Dr. Newman asked if it was of advantage to combine other methods of treatment with the hot air treatment. It is always of advantage to combine methods which seem to be indicated. The combination of whisky with hot air treatment is, however, very rarely called for because the indication for that agent seldom arises after the first treatment by hot air. The influence of the body treatment is essentially, inherently and profoundly a stimulating one. If the question of stimulation should arise, then, of course, additional stimulants ought to be employed. Hot air alone will not remove pus, but in pus cases hot air will localize the inflammation to the abscess cavity so that the outside structures will not be infected and the abscess cavity will be lined with an enormously thick pyogenic membrane. The abscess cavity can, therefore, be easily opened with the knife. The application of hot air treatment to an open abscess cavity will always markedly hasten the process of repair. The elimination produced by profuse perspiration is neither the only nor the most important element in the curative action of dry, hot air. If it were, then it would be desirable to aid this action by the use of diaphoretic drugs. We can obtain almost as profuse sweating by the Turkish bath, but such a bath does not produce the profoundly stimulating reflex nerve influence on the spinal centers and the profound action

on the metabolism of the body which result from the body hot air treatment. This treatment causes a profound increase in the urinary excretion and in the excretion of waste products through the lungs far more than by any other method.

EXHIBITION OF CASES TREATED BY THE X-RAY.

Dr. William Benham Snow: The first patient I wish to present is that of a lady who came to us in August 6th, without any diagnosis having been made of her trouble. At that time she was quite feeble. There was an offensive discharge from the uterus, and the organ was enlarged to nearly twice the normal size. A diagnosis of malignant disease was made. The results of treatment by the X-ray were salutary, the improvement being so rapid that all discharges ceased and the patient had improved generally within the first two weeks. The treatment was kept up for six weeks, at the end of which time the uterus was reduced to about one-half the size when treatment was instituted. It was then noticed that the process of breaking down had begun, and we felt that an operative procedure was necessary in order to save the patient from the autoinfection which invariably takes place under the process of disintegration of malignant growths. She was accordingly operated upon by assistant Dr. Herman Grad, and the parts removed. (It is now a little more than 4 1-2 months since the operation.) The uterus was found adherent to a loop of intestine, to the rectum, and to the bladder, and the tissues were so friable that when separating the adhesion with the bladder the fingers passed into the uterus. Dr. Grad accordingly found it necessary to remove the parts piecemeal. In little more than four weeks after the operation the roof of the vagina was completely healed, but healing of the abdominal wound was much more sluggish, possibly because of the effect of the previous X-ray treatment. The wound is now closed, and the patient is in excellent condition. She is receiving the X-ray treatment twice a week, the jacked Cauldwell tube shown in the January number of the *JOURNAL* being used internally. There is no induration and no indication of any malignancy, so that we have reason to believe that there will be no further progress of the disease. Dr. F. M. Jeffries reported the growth to be a most malignant form of sarcoma, and that the nuclei had undergone some sort of retrograde change, which observation is interesting as showing the action of the X-ray.

I believe the time has come when all cases of carcinoma or sarcoma should be rayed before operation. The next patient came to us with a tumor in the left breast. It was about as large as a good-sized lemon, and was diagnosticated as a carcinoma. The patient desired that the mass be removed if

possible without operation, and so we did what I think was not altogether wise, attempted to remove the tumor by raying alone. This method it too tedious. It took four months to reduce the tumor about one-half. The patient was then persuaded to have the breast removed. One axillary gland appeared suspicious, and this was removed, but the others were not. In our experience with recurrent cancer the cases in which the glands are removed exhibit a strong tendency to metastasis. The patient is in excellent condition now, two months and a half after operation, and there is no indication of any disease. The X-ray treatment will be kept up for a considerable time, and she will be kept under observation for a much longer time. We have much reason to think that by judicious management we can hold the disease permanently in check. The glands have been left as nature's check to metastasis in case of recurrence. At the present time we are raying all our patients with very little screening except for the face. Too much shielding is not judicious because in this way areas of possible infection may escape the influence of the X-ray. We ray all breast cases from the front with the plane of the anode parallel with the affected surface, and then from the back with the anode perpendicular to a line drawn to the axilla. In this way we include the whole of the affected side, and are certain that the chances of success are thereby increased. I am of the opinion that those cases which have been subjected to the X-ray treatment before operation will not show recurrence so quickly if at all, and, if they do that, it is much safer where the axillary glands have been allowed to remain.

Dr. Herman Grad: This case is a sarcoma of the abdominal wall. About three years ago the patient noticed pain in the abdomen. Various diagnoses were made at first, one of them being typhoid fever. She subsequently came under the care of a friend of mine in Binghamton, N. Y., who found a mass in the abdomen and advised an exploratory incision. On opening the abdomen he found that this mass was in the abdominal wall itself, and was situated between the peritoneum and the skin—in other words, in the muscular tissue. No attempt was made to remove it, but a portion was taken for examination and the wound closed. The section showed the growth to be a sarcoma. The case was then treated with Coley's toxins beginning with half a minim and running up the dose to ten minims, twice a week. There was a considerable reaction after each injection, but the mass began to disappear, and she gained about thirty pounds in eight months. She then came to this city, and was referred to me. For ten months I continued the treatment with Coley's fluid, but finally she was unable to take more than one minim at a dose without an exceedingly severe and protracted reaction. Noticing that the

mass was not diminishing, and was still about the size of an egg, I began the use of the X-ray last October. At first the treatment was employed every other day; then there was a burn and an intermission of three weeks occurred. Since then the treatment has been given about twice a week. The whole mass has entirely disappeared; the patient is feeling well in every way and there is no sign of any mass whatever. About ten months ago I presented the case to a medical society. I was then treating it with Coley's fluid, and the result even at that time was considered quite remarkable.

Dr. Snow: This case which I present is one of recurrent epithelioma of the lip. The recurrent cases are very much harder to cure than the primary ones. I have a record of many cases which have disappeared promptly under the rays, and have not recurred. All of them disappeared in periods varying from eight weeks to three months. This case is one in which one inch and a quarter of the lip had been removed before coming to us. An indurated spot had later recurred over the chin, about as large as a half dollar, and about three times as thick. It was quite painful, and the man was able to put in his mouth only very small portions of food. The X-ray treatment was given faithfully for five weeks, during which time the growth disappeared quite rapidly. I found, however, that too much tissue had been screened at first. The man disappeared for about two months, and on his return I found that the induration at the center, which had been thickest at first, had practically disappeared, but that the tumor was spreading out on either side of the lip. There has never been any ulceration in this case, which we consider a disadvantage. I believe if this man had been old or debilitated that ulceration would have occurred. A primary cancer of the breast in a patient of low vitality was broken down giving rise to startling toxæmia after the X-ray treatment had been carried out for a time. When the surface is open and ulcerating results are much more rapid and satisfactory. In another case of this kind I should only cover the upper lip during the X-ray treatment.

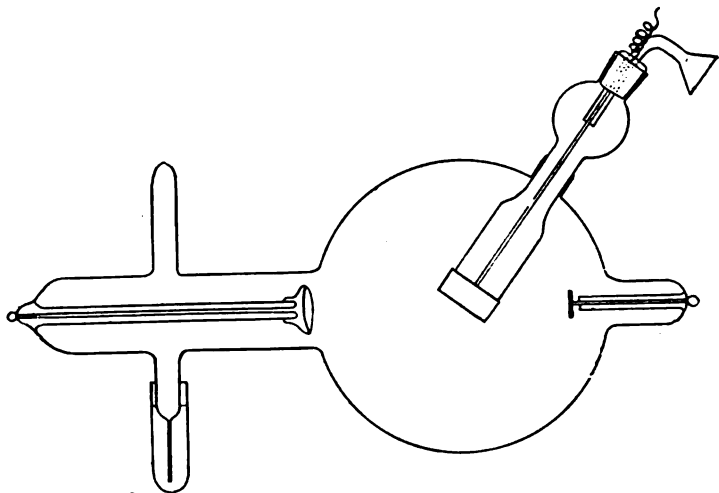
The next case is one of lupus vulgaris, which has been present with this young man since his infancy. He had been treated by some of the very best men in the city, but it has defied all of the former modes of treatment employed. Carbolic acid and the curette have been used quite vigorously on one side. On coming to us there was a small lupus patch in front of the right ear. This disappeared rapidly without the X-ray, under the influence of the brush-discharge. I believe that to be thoroughly successful with the brush discharge these cases should receive daily treatment. He has been treated only on alternate days, but good progress has been made with the large patch on the left side of the face. About one month

ago I began the use of the X-ray in addition to the brush discharge, and since that time the progress has been much more rapid. I rayed the lobe of the left ear four times after which it presented an appearance which indicated a tendency to break down, so I discontinued this treatment, feeling sure that if I persisted the lobe of the ear would be destroyed. I then substituted violet light from a powerful arc light, and this is still being used with marked improvement. I believe that when there is a marginal surface, the site of lupus, like this, the X-ray will cause it to slough off, whereas the light will accomplish what is desired without such an onward result. There can be no question but this case will be absolutely cured.

The next patient is a case of lupus erythematosus. He had the face covered with the characteristic "butterfly" patch. His ears were ulcerating on the margin, and were stiff. He is rayed usually with a low tube until the face just begins to blush. I believe the violet light will cure any of these cases, but that it will take a great deal longer than the X-ray. In this case it would probably require two years to effect a cure, whereas I expect to complete the cure in a very few months more. We can save time with the X-ray; and we can save parts with the violet light. The brush discharge is also employed with this case.

EXHIBITION OF NEW X-RAY TUBES.

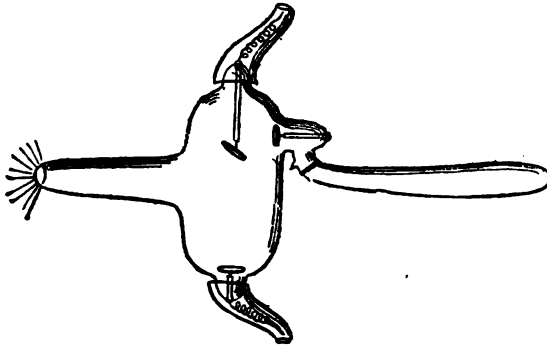
I will now show three new X-ray tubes. The first is a water-cooling tube, and is of interest to those who are using



Water-cooling Tube.

coils because it can be used with a large amperage without the anode plate being destroyed. It has the advantage that water

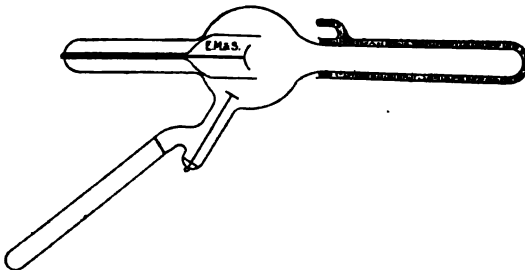
comes in contact with the metal, which is not the case in other water-cooling tubes. Hitherto there has been an intervening septum of glass. An unusually soft variety of glass tubing is employed, so that the glass can be directly fused to the metal. The requisite softness in the glass is obtained by means of an



The Morton Tube.

additional quantity of soda. A considerable volume of water is employed, and as the water becomes heated it travels along the tube some distance and is partly cooled in this way. Moreover, there is a vent which allows of the escape of steam. The tube at present is really in an experimental stage. These tubes have been excited with 230 volts and 15 amperes, and have stood this test. The tube is the invention of Mr. Machlett and is made by him at 143 East 23d Street, New York.

I wish next to show you a tube which is useful for localizing the rays to a small area. The tube is made entirely of lead



A Modified Cauldwell Tube.

glass with the exception of one end. The lead glass is practically opaque to the rays. I consider this tube a good one for the treatment of laryngeal cancer, except for the fact that the induced electrical discharge to the teeth is very painful, when the tube is introduced into the mouth. It is well suited for use

in the vagina if the tumor is small or it is frequently moved, changing the angle. For use in cavities it is not equal, however, to the tube which I show next. The modified Cauldwell tube projects the rays in all directions from the end of the tube. It can be used in the vagina and other cavities, but must be employed with caution, for when the X-ray is brought in such intimate contact with the tissues there is danger of producing an X-ray burn. So far, however, no such burns have been reported from its employment.

AMERICAN ROENTGEN RAY SOCIETY.

Third Annual Meeting, held in Chicago, Dec. 10 and 11, 1902. The President, Dr. G. P. Girdwood, Montreal, Can., in the chair.

Radiotherapy in Pulmonary Tuberculosis.

Dr. Gordon C. Burdick, Chicago, contributed this paper. Much of his work was based on a series of experiments conducted on guinea-pigs inoculated with the tubercle bacillus. He found that when a culture of the bacillus is exposed to the Roentgen ray its development is checked considerably, although it in every case failed to kill the germ. Pigs exposed to the ray lived much longer than pigs not so exposed. When the ray was used in cases of tuberculosis in man a slow but certain improvement took place and eventually a good recovery. Cases of fibroid tuberculosis yielded very slowly. Abdominal tuberculosis requires longer treatment than the pulmonary form. In a few cases a tendency to relapse has been noted. In the cases of mixed infection improvement is delayed and there is a very marked tendency to the sudden development of toxemia. Joint tuberculosis, in which only the bones are involved, offers the best results, but permanent relief cannot be obtained until complete ankylosis has occurred, and the author advises that nothing should be done with the X-ray until this ankylosis has occurred. He used the ray in a total of forty-three cases of tuberculosis in all parts of the body with uniformly good results, except in one case, in which death occurred. This was a case of advanced general tuberculosis, and even here the improvement was at first marked.

He does not believe that this is the method of treatment of tuberculosis that the profession has been looking forward to, but that it is only an extremely useful adjuvant in the treatment. For the purpose of gaining a certain end unquestionably good results have been attained with this treatment, but not an absolute cure.

Dr. J. Rudis-Jicinsky, Cedar Rapids, reported four complete cures out of twenty cases. In joint tuberculosis he cautioned against idiosyncrasy. In glandular tuberculosis

he said the results were bad, as recurrence followed in each case.

Dr. Russell H. Boggs, Pittsburg, reported decided improvement in six cases of pulmonary tuberculosis and an apparent cure after a year in one case.

Dr. Gibson, Birmingham, Ala., also reported good results.

Dr. Phillips, Cincinnati, found that he got better results in treating joint tuberculosis when he used a static cataphoresis instrument, using such remedies as formaldehyde and creosote.

X-Ray Treatment in Intra-Abdominal and Other Deeply-Located Malignant Growths.

Dr. Clarence E. Skinner, of New Haven, Conn., said that the effect of electricity on cancer is due to the specific influence of the X-light on the tissues. He reported thirty-eight cases of malignant growths treated with the X-ray with a mortality of thirty-four per cent. In three cases there was a complete disappearance of the tumor; continuous reduction in size of the tumor in fifteen; temporary reduction in size with subsequent increase ultimately, resulting fatally in one; complete apparent arrest in four; no effect demonstrable on size of growth in fifteen; complete permanent relief of pain in sixteen; complete temporary relief in three; partial in eight; no relief in four, and none at all in ten. General condition improved in fourteen; temporarily in eight; apparently not influenced in nine; in seven the general condition was not noticeably impaired when the patient came for treatment. Gain in weight in six; no influence apparent in thirty-two. Hemorrhage lessened in nine; not influenced in two, and no hemorrhage observed in twenty-seven. Toxemia of varying degree in fifteen cases. Out of thirty-eight cases there were three apparent cures; seventeen continuously benefited and are still improving, with prospect of ultimate cure; thirteen temporarily benefited; two not benefited, and in three treatment was discontinued by the patients regardless of any benefit.

Each of these cases was inoperable because of advanced disease and offered a hopeless prognosis by any other method of treatment. Three applications of the ray were made weekly, five minutes at a time, taking into consideration the patient, apparatus, and the result obtained from the treatment. The X-ray should be used only by skilled operators, as they alone are able to appreciate all the conditions which may arise in the course of the treatment. The application of the rays in different parts is fully discussed and also the methods and attention called to possible dangers.

The author arrives at the following conclusions:

1. The pain of deeply-seated cancers is affected by the X-light from slight amelioration to entire disappearance.

2. In many cases the X-light is capable of exercising an influence on deeply-seated cancers of sufficient intensity to retard the disease and prolong life considerably.

3. In a certain proportion of cases it possesses sufficient power to entirely overcome deeply-seated malignant processes.

4. A small number of deeply-seated malignant processes exhibited absolutely no indication of being susceptible to the X-light.

5. Phenomena indicating toxemia not infrequently accompany the treatment of malignant disease by the X-ray. This is due to the elaboration or development of toxins dependent on a retrograde metamorphosis of the tissues insusceptible of regeneration. The effect of the X-ray light is due to a stimulation of the reparative functions of the tissues dependent on an inflammatory reaction. Its destructive influence is always exhibited on tissues which are low in vitality.

Dr. J. P. Marsh, Troy, N. Y., reported a case of uterine carcinoma referred to him for hysterectomy, on which he used the rays to a favorable termination.

Dr. J. Rawson Pennington, Chicago, described his shield for application of the rays to growths in the rectum. He favors the high tube for this work on deep-seated growths.

Dr. J. N. Scott, Kansas City, Mo., believes that all patients operated on for malignant growths should be exposed to the X-ray as soon after the operation as possible. It hastens the process of healing in addition to giving the patient the benefit of the ray. It will also stop the tendency to hemorrhage.

Diagnosis of Calculi by X-Rays.

Dr. Russell H. Boggs, Pittsburgh, Pa., concludes that the X-ray is the only means by which calculi can be diagnosed absolutely, especially as calculous conditions are often very obscure, pointing to other conditions. Even minute particles of uric acid can be radiographed. Many gallstones cannot be radiographed because of the position of the gall bladder, change in its position and the composition of the stone. For radiographing gallstones a large amperage should be used, for a short time only, however. The apparatus must be a suitable one and the preparation of the patient is as essential as in a surgical operation and is the same. The time of exposure need not exceed from two to eight minutes, depending on the size of the patient. The author reported a number of cases and exhibited skiagrams of cases of renal calculi.

Dr. J. Rudis-Jicinsky, Cedar Rapids, Iowa, advised that in skiagraphing for renal calculi a plate large enough to cover not only the kidney, but also the ureters, should be used. The stone may be located in the ureter. The plates should be

examined beforehand to ensure their freedom from spots and imperfections. Skiagrams should be made from front and side, so that an accidental air bubble in the plate will not be mistaken for a stone.

BOOK REVIEWS.

MECHANICAL VIBRATORY STIMULATION. Its Theory and Application in the Treatment of Disease. By MAURICE F. PILGRIM, M. D., First Vice-President of The American Electro-Therapeutic Association; Professor of Psychiatry in the New York School of Physical Therapeutics; Editor of Department of Psychiatry in The Journal of Advanced Therapeutics. Published by The Lawrence Press, 110 Fifth Avenue, New York City.

The writer's effort to give the profession a conservative work upon the application of mechanical vibration which will outline the physiological actions and therapeutic indications for its employment has been successfully carried out in the pages of this interesting volume. The disposition of many physicians to take up the employment of the various physical therapeutic measures in a perfunctory and unscientific manner, without proper understanding of their therapeutic and physiological effects, is to be regretted. Dr. Pilgrim's effort fills a need especially felt at this time, when so many physicians are disposed to employ vibration as a remedy. His experience and familiarity with the subject are evident from the clear and scientific way in which it has been treated. The application of mechanical stimulation to the various nerve centers and the lymphatic glands makes necessary a knowledge of the anatomical points. The author has, therefore, provided eight excellent colored plates, which will be of great value to the student who wishes to employ vibration in a technical manner. To those who are unfamiliar with the subject, and those who would improve their method, we cordially recommend this little volume.

CULBRETH'S MATERIA MEDICA AND PHARMACOLOGY. Third Edition. A Manual of Materia Medica and Pharmacology. Comprising all Organic and Inorganic Drugs which are and have been official in the United States Pharmacopœia, together with important Allied Species and Useful Synthetics. By DAVID M. R. CULBRETH, M. D., Professor of Botany, Materia Medica and Pharmacology in the Maryland College of Pharmacy, Professor of Materia Medica and Pharmacology in the University of Maryland Medical and Dental Schools, Baltimore. Third edition enlarged and thoroughly revised. In one octavo volume of 905 pages, with 473 illustrations, cloth, \$4.75 net. Lea Brothers & Co., Publishers, Philadelphia and New York, 1903.

That a third edition of this excellent text-book is so soon presented is sufficient guarantee of the esteem in which it is held. Its appearance, also, is timely, as it will reflect the spirit of the new "Pharmacopœia." The profusion of illustrations which make the student familiar with the plants as they occur in nature, is an interesting feature of the work, for which it will

be prized by those physicians most interested in the botanical relation of the various vegetable substances in use. The placing of the measurements in the metric system, together with the approximate equivalents in English, will enable the student to become familiar with the use of the two systems. The attention paid to accentuation and pronunciation is a valuable feature of the text-book. The work is published in the characteristic, excellent style of this well-known house, and, as a whole, the work will be recognized and appreciated as a valuable addition to the literature of the subject.

NOTES AND COMMENTS.

The Panphysion.—We are pleased to observe that a new school has come into existence in Cincinnati, Ohio, under the management of Dr. Otto Juettnner, which is known as the Panphysion. The course of study includes Skiagraphy and X-Ray Therapy, Massage, Swedish Movements, Thermo-Therapy and Hydro-Therapy, Photo-Therapy, and Dietetics and Hygiene. It is pleasing to note the healthful turning to the teaching of these great subjects, which must fill an important place in the Therapeutics of the future. Too many such institutions under able and scientific management cannot spring up throughout the country.

Attention is called to the fact that "Physical Therapeutics," published in London and edited by Dr. Hedley, of which Dr. Margaret A. Cleaves is the American editor, will be hereafter known as the Journal of Electrology and Radiology. It does not seem that the new name will better express the scope of work covered by this excellent journal than the more comprehensive one by which it has been formerly known.

We wish the editors and publishers the success they so well deserve with this valuable publication. The last issue is an excellent number, containing among other interesting features the annual address of the president of the British Electro-Medical Association, Dr. Hedley.

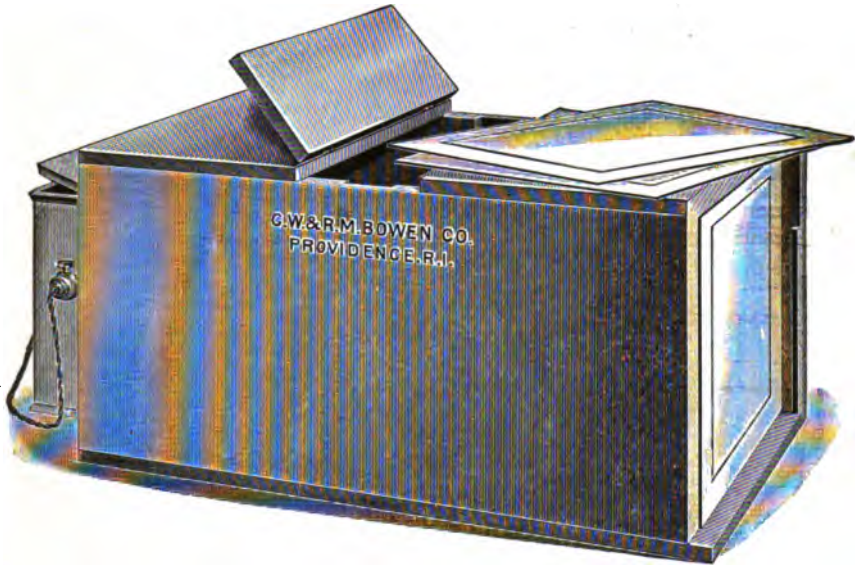
NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

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the rear is attached a metallic lantern, with hinged cover in which is the electric light. About midway of the cabinet there is an opening in the top, with hinged cover, into which may be dropped one or both of the paper screens to modify



the strength of the light from the rear, as required to show the details of each negative most clearly.

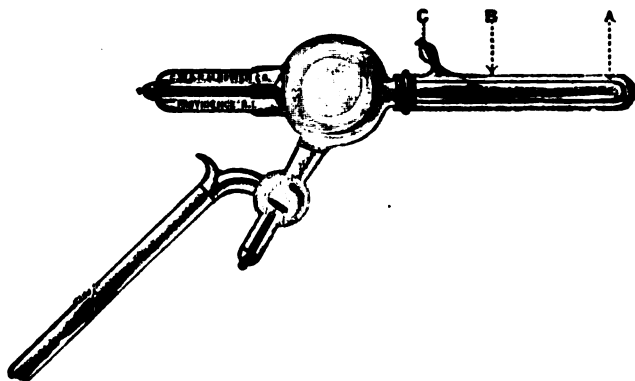
The outfit consists of the cabinet, shellaced; lantern attached at the rear, fitted with electric light socket, ten feet of cord and plug, which can be attached to any Edison socket, two screens, a reducing frame, for 8 x 10 plates, complete in packing box. Price, \$6.00.

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This is a convenient form of Tube holder, substantially made and of superior finish. It has a heavy hardwood base, to which is attached a revolving upright. Extending from this is the vertical shaft, consisting of three parallel pieces, and having a movable joint at the bottom, enabling extension to over five feet in height. At the top of this projects the arm socket into which the arm fits on a revolving joint, enabling fixing the tube at any horizontal angle. This arm has a long jaw, thrown open by a spring and compressed by a screw, arranged to hold tubes with varying sizes of stems up to two inches diameter. Attached to this arm are two outriggers through which the conducting Cords pass. These are adjustable, thus enabling fixing at any angle. Each is carefully packed in a box. Price, \$6.00.



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A. The vacuum end from which the X-rays are emitted. B. The water jacket. C. Opening for filling the water jacket. Price, \$12.50.

The Journal of **Advanced Therapeutics**

VOL. XXI.

MAY, 1903.

No. 5.

THE TREATMENT OF CARCINOMA OF THE RECTUM BY MERCURIC CATAPHORESIS.*

BY G. BETTON MASSEY, M. D., PHILADELPHIA.

The surgical maxim that complete local eradication is essential in all efforts directed toward the cure of a malignant process, even in its incipiency, is probably more difficult of application by ordinary methods to growths within cavities such as the nose, mouth, throat, vagina, and rectum than to those localized in strictly internal organs. The difficulty, or even impossibility, of removing all contaminated parts by the knife or curette leads to an incomplete eradication, with the resulting quick recurrence due to the stimulation of the proliferating organisms left in the periphery of the wound by the quickened trophic processes evoked in healing. That the absorbent surface created by the curette makes auto-infection of the fresh edges of the wound not only possible but probable, has been proven by the actual instances collected by Cullen in his recent work on "Cancer of the Uterus," † and the clinical history of the more malignant sarcomas and carcinomas after curettement almost invariably records a more rapid subsequent progress of the disease.

In this dilemma the surgeon should have recourse to any other means promising favorable results. Whatever success may be attained by Roentgen radiance in external growths (and this question is now under active determination), it is evident that the deep situation of growths within the rectum renders this method ineffective at once, by reason of the necessity for cutting off all but a few of the rays in their passage through the speculum, and the impossibility of deflecting even

* Read before the Philadelphia County Medical Society, February 25, 1903.

† "Cancer of the Uterus," by Thomas S. Cullen. D. Appleton & Co., 1900. Page 662.

these few effective rays after traversing the speculum in such a manner that the whole of the infected tissues may be reached.

Turning to another modern method of transmitting chemical energy by the electric current, the cataphoric diffusion of nascent mercury and zinc salts, it is evident that any amount of energy of this nature capable of safe employment may be harmlessly and easily transmitted to the site of application by means of a conductor of comparatively small caliber, so insulated as to absolutely protect the outer, healthy parts of the canal, and yet capable of definite and controllable diffusion from the point of the conductor uncovered by insulation. As the effect of the diffusion of these nascent metallic salts is their progressive union with ever-widening zones of protoplasmic bodies, causing immediate necrosis by the formation of albuminates of mercury and zinc, the method offers an easy plan for the complete and immediate destruction of a carcinomatous growth in the lower two-thirds of the rectal canal, if applied in adequate force under general anæsthesia. That this method is incapable of producing an auto-infection of the edges of the destroyed area is evident when we consider that no living cell or germ can exist within the effective radius of its energy, it being a true interstitial sterilization process, and that the healthy tissues beyond the slough produced by it are non-inoculable, and are themselves so penetrated by the chemicals for an inch or more to cause the death of such outlying lowly organized carcinoma cells that may have already migrated beyond the apparent edges of the growth.

I shall not here mention in detail the type of apparatus and exact technique of this work, which has been fully described as applied to external growths. A current with a voltage of from 110 to 160 is essential, capable of maintaining from 400 to 1000 milliamperes for an hour or more through the resistance of the body. The active electrodes are of course peculiar to this special site of the carcinomatous process, and I have usually been compelled to rely on solid zinc instruments, heavily insulated except at their active surfaces, the latter being coated with as much mercury as will adhere to them. The patient is placed upon an operating table in the dorsal position, with the back and shoulders resting on a thick absorbent pad, thoroughly moistened. Beneath which is placed a lead plate, the negative terminal, which should measure about 20 x 12 inches. The sacral

region of the patient should be protected from excessive action at the negative pad by slipping a piece of rubber cloth beneath the buttocks, the cloth leading down into a receptacle in front of the operator to drain away the water used in cooling the parts of the rectum near the seat of operation. The knees are elevated by leg-holders.

The patient having been thoroughly anæsthetized, the active electrode is inserted with the finger protecting the point until it is made to penetrate into the growth, when a current of 500 milliamperes is very gradually turned on. With the finger near the site of application, an increased heat will soon be observed, when but one electrode is thus employed, with this amount of current, and it is wise to keep the hard rubber tip of a fountain syringe also in the rectum and to turn on a little cold water every few moments to dissipate the heat thus produced. At intervals of twenty minutes the current should be turned off and the electrode replaced by another freshly amalgamated one, which may be placed in a slightly different position, thus gradually destroying all portions of the growth and sterilizing its various ramifications. The amount of current to be employed and its duration must depend entirely upon the judgment of the operator, assisted mainly by the sense of touch, as it is a striking fact that carcinomatous growths lose their hardness completely when the process has been carried to the point at which all the diseased tissues have been necrosed.

The after history of a case in which this major application has been thus applied is very simple. Pain will rarely persist longer than the effect of the ether, and should be lulled by appropriate doses of morphine, which has the further advantage of locking up the secretions until the slough comes away, from seven to fourteen days later, when the passage of the slough will be followed by normal fecal movements. At this time it is well to administer small doses of epsom salts, and maintain asepsis during the period of healing by rectal washings with potassium permanganate or some similar solution.

At the end of the fourth week an examination will show, usually, that no evidence of the disease exists, a healthy mucous membrane with possibly a cicatricial contraction existing at its site. Our patient is evidently well; but it is at this point that we should insist that our duty and the patient's interest require that we make a thorough examination of the site of the disease

every four weeks at first, and later at greater intervals, until a sufficient time has elapsed to exclude the possibility of recurrence. It is a lack of this after observation that has doomed many cases to failure that might have been saved after other methods of local eradication. On the slightest suspicious nodule at or near the site of the healed area a minor application with a zinc-mercury point should be made, and this can be effectively done without general anæsthesia, thus completing the effort at eradication that would have failed without this precaution.

The two following cases, though still recent, will illustrate the special features of the method when applied within the upper rectum and near the anal opening :

Mr. T., aged forty-four years, was brought to me from a town in Massachusetts, August 1, 1902, with the following history: He had been in the possession of excellent health until about nine months before, when abdominal troubles, supposed to be of a dyspeptic nature, brought him under the care of his family physician. Not finding relief, he went to California in the spring of 1902, and on his return, in April, was found to have lost twenty-six pounds in weight. Obstruction of the bowels finally developed. He was examined by Dr. Cabot, of Boston, and carcinoma of the rectum was clinically diagnosed, the diagnosis being confirmed by the microscope.

On examination the finger encountered a firm constriction about five inches from the anus, the lumen of which would not admit the distal phalanx. The constriction was cylindrical, apparently more than an inch long, and the edges were ulcerated and emitted the characteristic odor of malignant disease. For some time the ribbon-like stools had been replaced by watery discharges only under the action of salines. The patient's color was good, but he was greatly emaciated, and suffered from pain in the left groin.

Notwithstanding the unfavorable clinical evidences of metastasis, the patient was admitted to a private hospital, and on August 3 he was etherized and a major application of zinc-mercury cataphoresis applied as described, with the assistance of Drs. Hermance and Frank White. A current of 500 milliamperes was gradually attained and kept up for sixty-nine minutes, exclusive of the time necessary to change and readjust the electrodes. At the end of this time all portions of the

growth appeared soft to the finger, and examination with a lighted proctoscope showed the diseased area changed to a grayish white.

On the sixth day the general comfort of the patient was disturbed by a rise of temperature to 102°, with the development of localized swelling in front of the pubes and inability to void the urine naturally. Both of these symptoms persisted for several days, during which time an increasing quantity of débris passed from the rectum, a bedpanful of necrosed tissue finally passing in a single stool, followed by normal fecal passages. The patient went home at the end of three weeks.

On September 22 I examined the patient and found the parts healed, soft, normal mucous membrane covering the site of the growth, but there was apparently a valvular constriction produced by the scar tissue on the anterior aspect. The evidences of general metastasis still persisted, showing that the excellent local result had probably been attained too late for a cure.

The most recent case was referred to me by Drs. W. B. Snow and J. Griffith Davis, of New York.

Mrs. E. C., aged fifty-two years, had been of costive habit for years, but after the menopause, three years ago, the constipation was pronounced, and occasionally she would have some bleeding from the rectum. In June, 1902, she consulted Dr. Davis, who called Dr. Hermann J. Boldt in consultation. A diagnosis of colloid carcinoma of the lower rectum was made, and, on the 24th of June, Dr. Boldt removed the growth and gave an unfavorable prognosis. In November she was re-examined and a recurrence found. The case was now placed in the care of Dr. Snow, who applied Roentgen rays for several months, and as the growth was partly external, considerable benefit was derived from the radiation; though the upper portion of the growth progressively increased.

On January 25, 1903, the patient was admitted to St. Elizabeth's Hospital, New York, and, at Dr. Snow's request, I made a major application of zinc-mercury cataphoresis, assisted by Dr. Herman Grad, of New York.

The growth at this time involved the whole periphery of the anal scar and both labiæ of the vagina nearly to the clitoris, the perineum having been removed at the first operation, and extended up the rectum about three inches, completely blocking its caliber.

The patient was placed in the position described, three pointed zinc-mercury electrodes were inserted in different portions of the growth, and 500 milliamperes were gradually attained during the first half-hour, afterward increased to 1000 milliamperes. This large current was maintained for more than an hour, the whole operation consuming two and a quarter hours. The immediate softening of the whole mass was a most interesting result to the onlookers.

The patient suffered little or no pain subsequently, and three days later was taken to her home, some two hours' journey. Dr. Davis reported that the slough, quite a large one, came away February 7, bloodlessly; that fecal evacuations have been resumed, but that she suspected several minute nodules near the urethra would need further treatment. The whole of the vast surface exposed by the slough appeared to be healthy.

The patient was, therefore, readmitted to hospital, and on the 22d of the present month was again etherized and the doubtful spots on the upper portion of each labia majora and just below the urinary meatus were destroyed by the simultaneous use of several zinc-mercury points, with a current of 400 to 500 milliamperes for thirty-five minutes.

The site of the first operation, one month before, was found to be represented by a most symmetrical, clean excavation in the position of the anus, about three inches by four inches in outside dimensions, beautifully healed. The anal sphincter was, of course, entirely destroyed, but may be partially replaced at some future time by an appropriate plastic operation.

Conclusions.—From the record of these two cases, and also of two others previously reported, it is evident (1) that in the cataphoric operation we have a means for the immediate destruction of malignant growths in the middle, and possibly the upper, rectum, without damage to or dilatation of unaffected portions of the canal below the disease; (2) that the cataphoric operation possesses the advantages of bloodlessness, ease of control and direction, and freedom from the possibilities of operative infection, and (3) that the simplicity and directness of the method are a further advantage in gaining the patient's consent to subsequent surveillance and a reapplication at the earliest moment should some of the malignant cells have escaped destruction at the initial application.

THE PRINCIPLES OF TREATMENT IN DISEASES
OF THE GASTRO-INTESTINAL TRACT.

BY SIGISMUND COHN, M. D.

If we look back twenty-five years and compare the methods then used in the diagnosis and therapy of diseases of the gastro-intestinal tract with those of the present day, we are surprised to see what enormous progress has been made in this comparatively short time. The new era began with Kussmaul, who, in 1876, introduced the stomach pump in the treatment for dilatation of the stomach. After him Leube used the stomach tube for diagnostic purposes. But to Ewald and Boas belongs the credit of having put on a scientific basis the study of these diseases by their methods of gaining and examining the stomach contents, I mean the test-breakfast and the expression method. The patient takes in the morning, in the fasting condition, a large cup of tea, without milk or sugar, and a roll without butter. One hour later the stomach contents are expressed by the patient through the tube, and after filtration they are ready for chemical examination. By this new method so many new facts have been discovered, so much light has been thrown on subjects long unexplained, that it was only natural to make a separate study of these diseases by its aid.

For therapy, these great advantages have been gained, that now the physician is able to direct his treatment in accordance with the facts which he gains from his chemical examination instead of by the former way of trying the remedies at random. Therefore, we must not be surprised to find that the treatment by drugs has been almost abandoned, and that the dietetical and physical treatment have taken the front rank.

Especially the former, the dietetic, is of the utmost importance, and allow me, therefore, to refresh your memory concerning some fundamental principles of dietetics before I enter upon the real subject.

By dietotherapy is understood the treatment of diseases by the proper administration of food-substances which, on account of their physical and chemical qualities, either alleviate or cure diseases. A thorough knowledge of the diet in health is necessary for the understanding of the diet in disease, and therefore we will begin with the former.

Our nourishment is taken partly from the vegetable and partly from the animal kingdom. It is a mixture of various substances, which, according to their chemical constitution, belong to three groups of foodstuffs—(1) proteids, (2) carbo-hydrates, and (3) fats. Besides they contain water and mineral salts. The two main functions of the food are (1) to repair the wear and tear of the tissues, (2) to serve as a source of potential energy which can be converted into heat and work. The potential energy is expressed in terms of calories. A calory is the quantity of heat necessary to raise one kilogram of water one degree Celsius. As it has been found that one kilogram of proteids corresponds to 4.1 calories, one kilogram fats to 9.3 calories, and one kilogram of carbo-hydrates to 4.1 calories, we will be able to express all the food taken in this way by the amount of calories. The first function provides for the conservation of the material of the body, while the second function maintains the bodily energy. Carbo-hydrates and fats can never be used for the repair of tissues, only proteids can do that. For the second function, that of serving as a source of potential energy, all the foodstuffs can be used.

If we compare the body to a steam engine, the proteids would correspond to the metal of which the engine is constructed, while the fuel which is used to heat the boiler would correspond to the proteids, carbo-hydrates, and fats together. The body differs from the engine by its ability to use part of the material for construction as well as for fuel (proteids), while an engine cannot use its metal for fuel. It is this physiological superiority which gives the proteids their vast importance in the diet. Without proteids life is impossible.

Now, the question arises, how much food is necessary to meet the daily needs of the body, and how much of the food has to be taken from proteids. The first question can be answered in three ways. First in terms of the nutritive constituents, i. e., proteids, carbo-hydrates, and fats. Various experiments have been made by different authors, as Atwater in this country, Voit and Pettenkofer in Germany, Ranke, Moleschott, and others, and different standard dietaries have been constructed. If we take an average of all of them, the result will show that a healthy man of middle weight doing a moderate amount of muscular work will need in twenty-four hours 125 grams of proteids, about 60 grams of fat, and about

500 grams of carbo-hydrates. If we want to express that in terms of potential energy, we would have to remember that 1 kilogram of proteids corresponds to 4.1 calories, 1 kilogram of fats to 9.3 calories, and 1 kilogram of carbo-hydrates to 4.1 calories. By multiplying this with the above numbers we will get the amount of calories between 3000 and 3500. Another way to express it would be in the terms of the most important chemical elements which it contains, i. e., nitrogen and carbon, and that would be 20 grams of nitrogen and 300 to 320 grams of carbon.

With a healthy person, a diet according to these principles may never need any changes, but there are diseases, like rheumatism, gout, etc., where an excess of proteids taken with the daily food is supposed to be the cause of the disease; and now our second question has to be answered, which is the minimum amount of proteids to be taken in twenty-four hours without danger to the organism. To answer this question, we have to remember that proteids are there to fulfill two purposes: (1) To repair tissues, (2) to supply potential energy. It has been determined by physiological experiments that the greater the quantity of carbo-hydrates and fats which is supplied along with the proteids, the less do the latter tend to be wasted. The fats and carbo-hydrates are sacrificed instead of the proteids. Therefore, fats and carbo-hydrates are described as proteid-sparers. Especially is this the case with the carbo-hydrates.

Therefore, those foods which contain an excess of carbo-hydrates and a moderate proportion of proteids will be the food on which the least proteid will be wasted, and to them we will have recourse if we wish to preserve nitrogenous equilibrium on a minimum amount of proteids.

Twenty-five hundred calories with one hundred grams of proteids in twenty-four hours will be the minimum amount below which to go would not be advisable. Some authors go to a minimum of seventy-five and even fifty grams in twenty-four hours, but such a diet could hardly be kept up for a length of time without danger to the organism.

As we do not consume our food in the form of pure proteids, carbo-hydrates, and fats, they must be transformed into ordinary articles of diet, if our conclusions shall be of any practical value. In the first place, it is necessary to say that

very few articles of food contain the different nutritive constituents in proper proportion, i. e., we know that lean meat contains 20 per cent. of proteid, some fat, and no carbo-hydrates, while fat meat contains 16 per cent. of proteids, about 4 or 5 per cent. of fats, and no carbo-hydrates. On the other hand, potatoes contain 2 per cent. of proteids and 20 per cent. of carbo-hydrates. This teaches us that the different foodstuffs must be combined to constitute a mixed diet of proportions as laid down in the standard dietaries. In a general way, we can say that the proteids are taken mostly from the animal kingdom, while the carbo-hydrates come mostly from the vegetable kingdom, and so both kingdoms make up our mixed diet.

Now, with the knowledge we have gained in regard to the general principles of diet, let us see how we can make use of them in the diseases of the stomach and intestines. Generally, the stomach has been considered as the most important digestive organ, but that is not so.

Nature has provided for more than one way to do the digestive work, and we to-day know that the intestinal digestion is by far more important than the stomach digestion. In fact, the digestive work of the stomach is limited to the proteids. Its mechanical function, the carrying of the food to the intestines, is of much greater importance. This is a vital point in the treatment of chronic diseases of the stomach. Von Noorden and others have shown that emaciation in chronic diseases of the stomach is, as a rule, not caused by specific poisons, but by the habit of such patients to take an insufficient amount of food. No matter how great the disturbance of the digestive function of the stomach may be, as long as the mechanical power is not impaired, the food will be taken care of. That a person can get along without any gastric digestion we can see in the case of achylia gastrica, where hydrochloric acid is found in the stomach. As long as we support the motor power of the stomach by advising the patient to have the food in a fine state of division, and chewing his food carefully, he will not only retain his nitrogenous equilibrium, but may even gain in weight.

Another important point gained by this vicarious action of intestinal digestion is the proper administration of rest, on the one hand, and the strengthening of the diseased organ by the methodical adaptation to work, on the other hand.

There is almost a general tendency to spare a diseased organ, and especially so the diseased stomach, by giving it perfect rest. While this is right in acute conditions, as in acute catarrh of the stomach or in diarrhea, it would be entirely wrong in most of the chronic conditions, just as wrong as it would be to treat a heart with dilated walls by rest. Too much rest will always favor the progress of atrophy, whereas methodical adaptation to work will always strengthen an organ. Hemmeter, in his book "Diseases of the Stomach," speaks of cases of chronic gastritis which he had watched for twelve years, and he had found by experience that the sparing diet and too much rest had favored the progress of atrophy, whereas, a proportionate amount of food to keep up the caloric equilibrium had strengthened them. The mistake made in these cases is that the digestive capacity of the stomach has been lowered instead of raised to the normal capacity. The stomach should, therefore, be trained to do normal work. It is necessary to have a system to gain this point. Only by gradual adaptation to work is a strengthening of the organs possible. And, therefore, it is necessary to have a scale of foodstuffs. Such a one has been constructed by Leube. He uses it in the treatment of ulcer of the stomach, but it can be used in all conditions where we want to raise the digestive capacity. The goal to be reached is that the intestinal tract can take care of a normal diet without any disturbance. Leube's dietary list contains four parts, each to be taken for a week. First diet: Bouillon, Leube-Rosenthal's meat solution, milk, soft raw eggs, zwieback, English cakes (biscuits containing no sugar), water, natural acidulous waters (Apollinaris, Kronthaler, seltzer, etc.). Second diet: Boiled calf's brain, boiled calf's sweet bread, boiled chicken (young without the skin), boiled pigeon, boiled calf's feet, tapioca pap boiled in milk, beaten white of egg. Third diet: Raw beef (chopped very fine), raw ham (chopped very fine), beefsteak (superficially fried in freshest butter), finely scraped tenderloin of beef, mashed potatoes, white bread (stale), coffee with milk, tea with milk. Fourth diet: Fried chicken, fried squab, roast venison, guinea ham, roast beef (cold), roast veal (leg, saddle), boiled pike, macaroni, rice pap, finely chopped spinach, asparagus, stewed apples.

This diet has been improved upon later by Penzoldt, and is mostly used in this improved form. Another example of

how rational treatment by diet is able to strengthen an organ can be seen in the treatment of habitual constipation. In most of the cases a wrong habit of eating and drinking is the cause of the disease, and it is sometimes sufficient to change these habits to effect a cure of such a patient. Such persons are used to eat much meat and other easily digested foods, and the consequence is that there is not enough of waste-products left for the physiological stimulation of the colon. Give such patients whole wheat-bread, instead of white bread, let them eat more vegetable foods, especially the green vegetables, and restrain them from eating too much meat, and you will be astonished at the good results. Of course, cases of ten or fifteen years' standing will need besides the diet also the physical treatment to restore them to health. At a former opportunity I have already mentioned the important part electricity takes in this disease.

I could continue to show you, in many other cases, how on the one hand rest, and on the other training, is the proper method to be employed. As a general rule, it will be rest in acute diseases and training in chronic diseases.

Coming now to the treatment by physical therapeutics, the most important one is the gastric lavage, i. e., the washing out of the stomach. I have already mentioned that it was Kussmaul who, in 1876, first used the stomach pump for this purpose in cases of dilatation of the stomach.

His method has been simplified, and to-day we use the plain tube for gastric lavage. The indications for using the lavage will be, first, in cases of poisoning; second, in cases where the food is stagnating in the stomach, and, third, in chronic catarrhs of the stomach where large quantities of mucus are present. In the cases of stagnation, the lavage relieves the stomach from fermentative processes which keep up a constant irritation, while in the second case, where we remove the mucus, the stomach juices are then able to come in contact with the food and to exert their digestive faculty. While the method of gastric lavage is plain and simple, it may not be superfluous to mention a few points. First, in regard to the time. I would like to say that it is always best to wash out the stomach in the fasting condition. By doing so we avoid the obstruction of the windows of the tube by particles of food, and the flow of the water will be easy. Second, we are able to find out if there are pieces left from the food taken the

night before, and so we have a good test for the motor power of the stomach. Another advantage is that food is not removed from the stomach which may be used yet as nutritive pabulum.

This last point is very important, as sometimes abuse has been made of the tube by patients who washed out their stomachs themselves, and did so at every opportunity. It is not seldom that patients lose thirty to forty pounds by this abuse of the tube.

The introduction of the tube is easily done. Let the patient sit straight, with the head slightly bent forwards, and not backwards, as generally done. By doing this the saliva will not flow backwards and gag the patient, and the spinal column will not form an obstacle to the introduction of the tube into the esophagus. The moment the tube touches the pharynx let the patient swallow, and by pushing the tube down simultaneously it will reach the stomach in a few seconds.

Contra-indications for the use of the tube are hemorrhages or ulcers of the stomach or aneurism of the aorta thoracica.

Electricity can be used either externally or internally. If externally, the electrodes can be put, one on the abdomen, the other on the back. All currents can be used as on other parts of the body. The internal method is performed by Einhorn's deglutable electrode. Here also it is preferable to give the treatment in a fasting condition, or one to two hours after a light breakfast. The electrode is easily swallowed by the patient, who drinks some water afterwards, until the electrode reaches the stomach. The drinking of water will answer two purposes: First, to avoid the contact of the electrode with the walls of the stomach, and, second, to distribute the current over a wider area. The galvanic as well as the faradic currents are used. The galvanic current is very beneficial in gastralgia and similar conditions, while the faradic current is used for stimulation.

Surgery has taken lately an important part in the treatment of diseases of the gastro-intestinal tract. The operation which is the most important one, and will do the most good, is the gastro-enterostomy. It will be used in cases of a stenosis of the pylorus, either from a tumor or some other cause. For the stenosis of the cardia an artificial fistula will be the proper operation, while the radical operation for cancer will hardly be recommended.

I am well aware that there are yet many points which ought to be mentioned, as, for instance, the rectal feeding, the artificial foods, the treatment by acids and alkalines, the mineral waters, drugs, etc., but as this field is so large that I have to restrict myself only to the principles of the treatment, you will pardon me if I close now, hoping that I may have contributed a little to the better understanding and larger use of the dietetical and physical therapeutics in the treatment of the digestive tract.

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THE RELATIONSHIP OF PSYCHIC SUGGESTION TO ELECTRO-THERAPEUTICS.*

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If, then, the sick have the inherent power to evolve a cure, what is the need of a physician? Why not leave Nature alone to do as she pleases as in the case of all the lower orders of animals? We should reply, doubtless, if we answered properly, that if the injury or disease be of unusual severity, the natural reparative property requires stimulation in order to become available in time to prevent degenerative changes being instituted within the organism. The physician endeavors to put the ailing organism in such condition as to readily permit the needed remedial changes to take place. Can he at the same time stimulate by his treatment the *vis medicatrix* so that it shall operate with greater force in overcoming deviations from normal physiological function? Undoubtedly he does do so, but does he do it *solely* or mainly with his drugs or electricity? Are there not other if not more efficient means by which this may be and is accomplished? In my judgment, based on considerable observation and experience, much more can be accomplished in this direction by psychic suggestion in its varied methods of application, in combination with other appropriate treatment, than with either

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singly or alone. This is believed to be a very temperate statement of a momentous fact and very much under-states the truth. Nevertheless, I have no desire to dogmatize nor claim what to the unprejudiced mind may seem extravagant, for I realize fully that the world has, from time immemorial, been cursed by attempts at making half-truths do the full duty of the whole truth.

Not everything, indeed, not very much, perhaps, is really known concerning this organic faculty—the *vis medicatrix*—but it is evident that its energy is sometimes kinetic and at other times merely potential. It is very similar to the action of a watch: when the watch is wound, the spring acts, slowly uncoils and the hands move; but, some obstruction is liable to clog its wheels at any moment and thus hold the power abeyant.

It is not my intention to attempt by argument to establish even a *prima facie* case for psychic suggestion as a curative agent. The only purpose of this paper is to indicate the value of this newly recognized force to the electro-therapist in connection with his work, and, incidentally, to appeal to my professional colleagues to investigate and rescue it from incompetent hands and place it where it rightfully belongs and where it should always have been—with the medical profession. While adhering to that purpose, I may with entire propriety remark that psychic force, like many other agencies of acknowledged potency, does not make its strongest appeal to the eye or ear or any of the physical senses.

The "Crookes Tube," for example, does not appeal powerfully to any of our mere physical senses. Visually considered, it is not intense; it feebly appeals to the sense of touch, and is noiseless in operation; nevertheless, it will penetrate the densest substance, disclosing the hitherto unseeable and unknowable. And more remarkable than all this is the fact that this light which so feebly appeals to our outward senses, is at this very time demonstrating its power in the direction of destructive metamorphoses. What the surgeon has been unable successfully to accomplish with his knife, is now being performed by this noiseless agent. The "X-ray" tube may fairly be said to have now brought the most malignant type of cancers within the classification of curable diseases. Still the question remains and recurs as to what the X-ray really is,

and how these remarkable results are obtained. A recent writer, referring to the subject, says:

"In the X-ray we have a new and as yet imperfectly understood force, a new form of energy which is neither electricity nor light, although produced by one and closely related to the other."

And now we are hearing almost daily of new and successful experiments in wireless telegraphy and telephony which, considered from a material point of view, cannot and do not appeal to our physical senses or belief. The physical senses are not the only channels through which we are made acquainted with the ceaseless unfoldings of the mysteries of that great cosmos in which we live, but of which we still know, comparatively, so little. Permit me to invoke, for the psychic element in the treatment of disease, something of that spirit of unbiased and reverent investigation that is being accorded to the recent developments in the realm of what I may not inappropriately term the more material sciences. Individual observation and experience must, after all, supply the strongest ground for belief here as well as elsewhere. In the beginning, however, reliance must, to a considerable extent, be placed upon the results of the investigations of others along a given line. Nor is such a course a radical departure from ordinary procedure. It is surely not asking an unusual or unreasonable concession. The whole pathway of electro-therapeutics has been illumined by the patient investigations and achievements of esteemed colleagues pioneering far in advance of us, whom we have felt it an honor and privilege to follow. Very much that is of value in electro-therapeutics to-day, we owe to the labors of honored colleagues, many of them members of this Association, whom it would be a pleasure to mention here by name were it not that obvious propriety forbids.

Those mountebanks—jugglers with psychic phenomena—careering under the names of Christian Scientists, Psychic Healers, and the like, either through ignorance or desire for gain, endeavor to create the impression that a patient can expect nothing psychically unless all belief in the efficacy of every other form of treatment is absolutely and unreservedly renounced. This seems to me to be the very consummation of absurdity, and is as mischievous as it is

ridiculous. One of the leading physicians of Great Britain, the celebrated Dr. Tukey of London, has for years been treating his patients with drugs *and* psychic suggestion. He has found that the use of the one re-enforced the other, thus greatly enhancing his usefulness. In a personal interview, three years ago, he assured me that the results obtained by him through this combination of method, were incomparably greater than he was ever able to realize with either, acting singly or alone. We have abundant warrant for expecting better results from the combined treatment than from relying solely upon either,—an expectation justified alike by theory and practice.

The important, the imperative condition to be attained in psychic treatment, is to bring the patient into right relationship with the operator. Obviously, the methods for accomplishing this are numerous and varied and must be determined to a considerable extent by individual preference and judgment. The administration of a drug or the application of any other material agent, apart from its inherent value, serves the very highly important purpose of what I may appropriately call "objectification." They tend to put the patient's mind and neural organism into a receptive condition and facilitate the necessary surrender to the action of *vis medicatrix* which it is the design of all forms of treatment to evoke. In other words, these material agencies, when judiciously employed, aid very powerfully in bringing our patients into the sub- or super-conscious state where psychic suggestion is most readily accepted and appropriated. The greatest barrier to success in psychic treatment is usually our inability to readily bring our patient into this condition of passivity and surrender to the power that is evoked in his or her behalf.

The electro-therapist enjoys the exceptional advantage of accomplishing much if not all of this for his patient, automatically. Patients usually come to us manifesting the keenest interest in what to them is a novel and new form of treatment. Electricity, as a curative agent, possesses a sort of fascination for most people. Faith in its remedial capabilities generally coincides pretty closely with the degree of interest that this agent arouses. Patients who seek electrical treatment come to us expecting to be benefited if not cured. Then, too, the aramentarium of the electro-therapist ap-

peals to them; and his subsequent manipulations in the application of the electric current afford an almost ideal opportunity for initiating and completing the psychic impression. No other therapist possesses a tithe of his advantage. We do not have to explain, argue, or entreat. Nor do we antagonize our patient's prepossessions or arouse his fears (not to mention those of his friends) as is too often the case in treatment through hypnosis. And still less, we need not exploit a set of unthinkable and impossible statements of alleged facts as conditions-*precedent*, so much in vogue among the followers of Mrs. Mary Baker G. Eddy. The patient ordinarily goes into our consulting rooms fully prepared to receive and appropriate all the help that we are disposed to offer, regardless of its character or the method of its application.

As the caption of this paper indicates, it is my firm conviction that the relationship between the two forces of psychic suggestion and electro-therapeutics, is a natural and ought to be a close and intimate one. Experience will not fail to demonstrate that the one will, if given the required opportunity, supplement and complement the other. The electro-therapist who treats his patients psychically as well as electrically, will not fail to greatly enlarge his list of curable diseases. By such procedure he will, moreover, discover possibilities in electro-therapeutics far surpassing his present fondest and most ambitious hopes.

Professor William James, of Harvard, in his statement of the psychological proposition that "whatever determines attention, determines action," has given us the hint which, if intelligently applied to each case, individually, will lead to the solution of the ever-present but oftentimes perplexing problem of how best to make the attempt to arouse the desired psychic stimuli in our patients. The correct solution of this problem and the intelligent application of right psychic methods will, in my judgment, remove many of the limitations of electro-therapeutics, by converting into present actualities, many of the impossibilities of the past.

DISCUSSION.

Dr. C. R. Dickson said that the reader of the paper deserved our sincere thanks for bringing up this interesting subject in such a manner. The subject was a delicate one,

but had been treated frankly and in a masterly way. Many of us were disposed to shelve the matter as an inconvenient one. From time immemorial psychic suggestion had been carried on by the medicine man of the desert. He takes a shoe off his favorite steed, heats it to a red heat and applies it to the breast of the sufferer in order to reduce fever. Such treatment was largely one of suggestion. The speaker said that his old and revered preceptor Dr. William H. Thomson had once graphically described this treatment. Dr. Dickson said he recalled a well-known physician of New York speaking of another physician in that city who cured his patients by psychic suggestion incident to the use of apparatus. The sooner we recognize that psychic suggestion had an important and proper place, the better for all. Where there was a good deal of chaff there must be some grain, and we should sedulously search for the grain, being frank among ourselves regarding the part played by psychic suggestion. A step in this direction had been made by the paper just presented.

Dr. C. O. Files said it might well be asked, "Where are we at?" He remembered well that when a medical student making use of the old work of Wood on Theory and Practice, the treatment of every acute disease was begun by withdrawing from one to three pounds of blood from the arm, and if the patient were alive after this, he was given thirty grains of calomel, and if he still lived, tartar emetic was given in considerable doses. In more recent years physicians had adopted the practice of giving calomel in doses of one-tenth of a grain, although even then sneering at the homeopaths for giving infinitely small doses. Now, it seemed we had gotten down to something beyond even infinitesimal doses: nevertheless he believed we were on the right track. Although perhaps still in the infancy of the knowledge of therapeutics, we were undoubtedly making progress. There was no occasion to throw away the calomel, the aconite, and the morphine. His own observation had taught him that there was something required besides material force for the successful practice of medicine, and he thought the paper of Dr. Pilgrim should be very helpful to us. The first suggestion that came to his mind was that certain physiological or pathological changes follow mental impressions. For example, if he came up to a person and suddenly announced that a dear one had just died, the result would be a complete change in the circulation of the blood of the person so addressed—a pathological condition had been excited, if you will. If all this could be accomplished by one word, why should not important results follow the proper use of psychic suggestion? He heartily agreed with the general tenor of the paper just presented.

Dr. William Stevens, of New York City, said that he thoroughly appreciated the paper as well as the remarks of those discussing it. Dr. Dickson had demonstrated psychic force pretty thoroughly.

Dr. Robert Reyburn said that a great thinker once said that on attempting to avoid one error there was a liability of falling into another. Dr. Pilgrim need not have made any apology for his paper, for it conveyed a great truth. The man who gave medicine was far more important than what was actually given. He thought physicians did not always appreciate the great moral force they might exert. If a patient came with an incurable disease to say to him bluntly that nothing could be done, and that he must die, appeared to the speaker brutal, and he noticed that when a physician was in the plight of such an unfortunate patient he did not like such treatment. Psychic suggestion was certainly a wonderful aid to our practice, and often constituted the difference between a successful and an unsuccessful physician. It was the duty of all of us to take this powerful means of treatment out of the hands of quacks.

Dr. G. Betton Massey felt that the paper was a very valuable one, and an able presentation of the subject, and yet he was sorry that it had been read in public because one of the forces that electro-therapeutics had had to fight in the past was the talk that there was nothing but psychic suggestion in it. He agreed absolutely, however, with everything that had been said by the author. He would specially insist upon the necessity for something material going with the suggestion, and here was where the disciples of Eddyism had made a mistake, for they felt it was necessary to turn their subjects crazy before they could influence and benefit them. His adverse criticism of the paper was based upon his firm belief that this was not the place to exploit the truths under discussion. This means of treatment had been used from time immemorial, and what we needed was to build up something on the other side to help the suggestion.

Dr. W. B. Snow said that while agreeing in part with Dr. Massey, he did not think we should fear prejudices so long as right was on our side. He hoped this valuable paper would bring suggestion into its proper position as a therapeutic agent. Many of our neurological friends were disposed to assert that electro-therapy constituted little but a means of suggestion. He did not agree with Dr. Massey that the paper should not have been read; on the contrary, he thought it should be widely published, and that the electro-therapeutists should stand by it. There was nothing more radically wrong than to give a placebo as a placebo, for, from this he believed the cause of medicine was suffering more than from any other one thing. The man who does not make

his diagnosis, but carelessly applies therapeutic measures was the one who was doing mischief to the whole cause of practical medicine. He believed that at the present day placeboes were the curse of the medical profession, and unscientific persons were to-day standing behind these placeboes and using psychic suggestion without adequate help. It was far better, in his opinion, to use the proper thing in the proper place. The teaching of psychiatry as well as of electro-therapeutics to-day should be a part of the curriculum of every medical college. What man had discarded electricity who had used it properly and therefore successfully? The proper knowledge and use of suggestion should be taught and practiced.

Dr. A. C. Geyser, of New York City, said that the paper must be commended from every point of view. On hearing Dr. Massey's objection to the reading of the paper he had been undecided as to whether Dr. Massey was right or wrong, but now that Dr. Snow had spoken he felt positive that Dr. Massey was right. As soon as the public were acquainted with the fact that suggestion was employed by the physician, the laity would find no occasion to come to the physician, and as the mystery had been removed, the physician would no longer have any power.

Dr. J. D. Gibson characterized the paper as an admirable one, and he was of the opinion that in the Transactions we should care very little what the public thought regarding them. These papers and discussions he did not consider public property. Moreover, he did not agree with the last speaker that if the public understood that psychic suggestion was employed by the physician the public generally would employ it, and that the power of this important therapeutic agent would be lost. In his home society he was often severely criticised and charged with too much enthusiasm over electro-therapy, which was characterized as nothing but psychic suggestion. Mental influence was of great value, and he did not believe any physician could accomplish very much if his personality were entirely left out; it was just as important as his calomel and quinine. This personality might be called hypnotic influence or anything else, and often the physician himself did not recognize the power he derived from this source; nevertheless it existed and should be recognized as an important factor in his practical work. We should, therefore, look in a straightforward way at the subject under discussion. He knew of physicians who had lost their influence because they had gone, as it were, crazy on the subject of hypnotism, and had practiced it openly and on the slightest provocation, both in season and out of season.

Dr. F. B. Bishop said he thought Dr. Massey and Dr. Geyser were unnecessarily alarmed about the public's knowing of the influence of suggestion in the hands of physicians.

If there were any danger of the patient leaving the physician and going to the hypnotist or Christian scientist they would not exist at all. A case in point was cited. A lady had been sent to him a few years ago by a surgeon in Washington with what he termed a hysterical knee. There was not the slightest sign of inflammation in the joint, and yet she was limping around and insisting that the knee felt so cold that she must keep it wrapped in wool and heated with a Japanese hand stove.

After the first two or three electrical treatments she seemed to improve, but she soon failed to improve and then discontinued treatment. He heard nothing further from her for three or four years, when he learned that she was under the care of an orthopedic surgeon. On returning to the speaker she said that she had been doing well with a plaster cast on the knee, but had accidentally wrenched the knee, and this had caused a relapse. After being under his treatment again for some time she went to a sanitarium in New York, and from there wrote to know how electricity should be applied to her. Several months afterward she returned to him saying that she had been meanwhile treated by suggestion, and that she had improved considerably. This case showed that no matter what was preached or believed these people would come to a physician if they thought they could be benefited. In a very modest and gentle way the physician could often employ suggestion very successfully, and without the patient's knowing it. The spirit of hope infused into the physician's conversation and advice was most important, and the more the public knew this the better for the profession.

Dr. Lucy Hall-Brown, of Brooklyn, N. Y., said that admirable as the paper was she agreed absolutely with Dr. Massey, that it was unfortunate to exploit such a subject. It was true, we must be thoroughly honest, as Dr. Snow had said, but if we extended this argument further and told the patient that he was not to be told the exact nature of his case, and that suggestion was going to be employed in connection with the electricity, it was not likely that success would crown the effort. Suggestion could be employed in our treatment, as Dr. Bishop had said, without letting the patient know that this agent was being employed. She had been a delegate to certain medical congresses in Paris in 1900, and she had found that the French physicians and many of the foreign physicians, were much interested in suggestion and employed it freely in their practice, but they did not exploit it at all in the meetings.

Dr. W. B. Snow said that he had been misunderstood, for he had not advocated the idea of telling the patient what **was** being done by him. He did not understand Dr. Pilgrim to so advise.

Dr. M. M. Johnson said that the paper was to be commended, nevertheless the subject was one which should be approached with good sense and caution. There was a class of patients with whom the Christian Scientists had not been successful—for example, they had not cured many cases of advanced cancer or of pulmonary tuberculosis, or indeed, many cases in which there was an organic change. This drew the line quite sharply between functional and organic disorders. Suggestion might be good to the extent of giving the patient a wholesome confidence and patience in connection with the efforts of the physician to overcome the disease process. He would ask the neurologists present if the great majority of the patients they treat were not men and women, who through overwork or other cause had become exhausted and functionally deranged. The most serious diagnoses and prognoses had been made in many such cases, even by eminent physicians, and as a consequence such had drifted into the hands of charlatans and had improved. In cases of mental and physical exhaustion if hope and courage could be substituted for their despondency they would improve, and this was often best effected by suggestion.

Dr. C. E. Skinner said that there could be no question regarding the value of suggestion in therapeutics, and in a certain class of cases nothing but suggestion would effect a cure. It was our business to cure disease, and hence, we should employ this powerful agent, but being a powerful agent it should not be allowed to remain in the hands of ignorant charlatans. The best way to avoid this was to discuss the subject frankly in our societies.

Dr. George E. Bill, of Harrisburg, said that he had been deeply interested in this subject for many years. It should be remembered that humanity was made up of psychism and physicism, and that the latter was controlled by the former—an intangible and subtle force. In estimating these forces there was only one law of correspondence to be detected in that law, in his opinion, and that was motion. This motion was characterized by two distinct and different features which were termed in the laws of electrical science, polarity. There was the greatest difference in this field of psychiatry, not hypnotism, which was a misnomer and touched only one phase of the immense field under discussion, and which had been too long left to charlatanry. It was incumbent upon the medical profession to search out these laws. As to the physical phase, the speaker raised the question as to how suggestion acted upon physicism. He thought the cream of this excellent paper had been missed in attempting to ascribe the *vis medicatrix nature* to suggestion. Was there not motion and interaction in every direction? His studies in this field led him to think that there was a law of polarity running

in psychiatry. This law of polarity could not be discovered unless the domain of psychiatry were divided into two parts, called the dominant form of hypnotism, or objective, and the subjective form. They were widely different.

Dr. Robert Reyburn said that he thought the plea of Dr. Massey was not well founded. The profession had really taken the electrical treatment out of the hands of the charlatan, and this was just what the profession desired to do with suggestion as a therapeutic agent. It would be done, too.

Dr. Pilgrim closed the discussion. He said that no one believed more absolutely in the inherent value of electricity as a curative agent than he did. Dr. Bernheim and those agreeing with him were utterly wrong in asserting that its therapeutic value resided wholly in its psychic effects. But electricity *alone* had not cured, and would not cure, all cases that were pathologically curable and should be cured. What would Dr. Massey do with that numerous class of cases that simulated organic disease which did not in fact exist? What is to be done with cases of "pain habit," or fixed belief in the incurability of some existing curable disease? What except a change of psychic (mental) polarity will render a cure by any material agent possible in such cases? Neither electricity nor any other physical agent, *used solely as such*, is able to do it, because the composite human being is a soul *and a body*, and not all body. Health is not entirely a physical experience. Moreover, any of these non-organic affections are liable, if long continued, to lead to degenerative organic changes. The uncontrolled "psychic element" in diseases of all kinds has, in the past, been too much overlooked. It is present in all forms of disease, oftener than we imagine. It has brought defeat under all methods of treatment where but for its continuing presence, success might have resulted. Its removal in many cases means success or failure with a given treatment—whether by electricity or anything else. It doesn't matter *how* you arouse the *vis medicatrix* stimuli in a patient, if only you do it!

I do not contend or believe that words are necessary to its accomplishment, if the physician understands his business psychically. The patient need know nothing about the psychic treatment that is being used adjunctive to the electrical. But the physician must know a good deal about it. He must recognize its existence, believe in its power, and know how mentally to influence his patient's subjective or subliminal self. Faith thus becomes here both kinetic and potential, and is more essential to the physician than to the patient, desirable as it is for the patient, too. But the physician must know how to put himself into proper psychologic condition to affect psychically his patient and thus remove the psychic element

which may be retarding or defeating the successful use of his material means, whether drugs or electricity. This is not such a simple thing to accomplish as some of you gentlemen, by your remarks, would seem to infer. To acquire facility in doing it will require some study, considerable application, time, and experience. Indeed, it must be learned like everything is acquired. It is not such an inconsequential thing that anyone can do it off-hand and by merely making up one's mind to do it. It requires concentration of the subjective self and subjective faculties. It is faith to be sure, but faith plus a great deal more. That is what I mean by psychic suggestion. Its methods of application, to be sure, are as varied as the personal equation of practitioner or patient. We may not thereby cure "many cases of advanced cancer or tuberculosis," as Dr. Johnson expresses it, but we will prevent much of the reproach which often attaches to our profession when patients leave us after a course of unsuccessful treatment, thinking they are sick, or are actually sick, and get well under the ministrations of some cranky system that has blunderingly succeeded in effectively applying a little of the virtue that inheres in psychiatry. Gentlemen, it is this sort of thing, rather than discussion of this question, that is liable to hurt our Association and discredit electricity as the positive curative agent we all know it to be. By this, I mean our failure to cure a case, which, leaving us, drifts into the hands of a "healer," so-called, who gains control over the psychic complication which we failed to do, and thus renders possible the patient's recovery. Do you not all know of such cases, and many of them? Is it good for electro-therapeutics or general medicine that this should continue? To enforce this truth was the sole object of this paper. Practical results have repeatedly demonstrated that even the curative potency of electro-therapy can be strengthened through a psychical as well as a physical appeal to the resident *vis medicatrix*. It will often save the life of your patient; save you from having dissatisfied patients; and save electro-therapy from many imputations otherwise, of inability to cure, etc.

In conclusion, Dr. Pilgrim said that, much as he esteemed electricity and valued his connection with this Association, as long as he held the right to practice medicine, the cure of his patients, regardless of the therapy to be employed for the purpose, should continue to be his first, as well as his ultimate consideration.

THE PROSTATIC ELECTROLYZER, IN ITS TIME- AND-TROUBLE-SAVING AND CURA- TIVE ASPECTS.

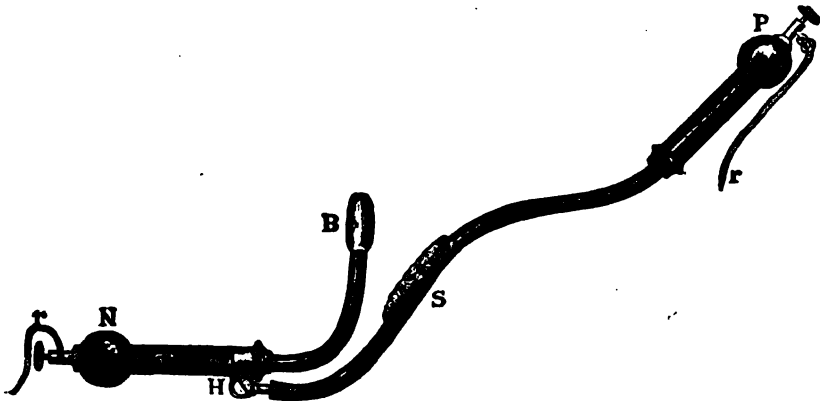
BY JOHN V. SHOEMAKER, A. M., M. D., LL. D., PHILADELPHIA, PA.

Twelve years ago a lay friend of mine, who is an inventor, was present on an occasion of an application by me of the galvanic current for inflammation of the prostate gland, in which he saw me forced to assume a most ungainly attitude, crouched behind my patient, remarked to me that the mechanical awkwardness of the operation ought to be remediable. "How would you avoid it?" I inquired. "By some simple apparatus," he rejoined. "Devise it," I said, and in the course of a week he had perfected the instrument which I have ever since used and recommended for treatment of inflammation of the prostate. Since then the so-called "Prostatic Electrolyzer" has made for itself an enviable history.

But, first of all, it may be, even at this late day, prudent to say a word by way of bringing some persons to a realization of the fact that galvanic electricity is beneficial for treatment of inflammation of the prostate. We have not quite emerged, but we shall not have completely emerged, from the prejudice in the medical profession against the therapeutic value of electricity; generated by practice in it having first largely fallen into the hands of quacks, until the older generation of physicians now living shall have passed away. Why, within only a few years, some belonging to that generation, men skilled as general practitioners, and, at the same time, justly renowned as specialists, have honestly confessed that they know absolutely nothing of the remedial effects of electricity in a single manifestation! For the purpose here in view, however, I cannot descant upon this topic, but must confine myself to consideration of the efficacy of electrization in reduction of inflammation of the prostate gland, and, lastly, to speaking of the instrument, here figured, called the "Prostatic Electrolyzer."

The obscurer of the effects noted by a scientific observer, upon the application of the galvanic current to the prostate through the rectum, are the dilatation of the rectum and a marked increase of flow from its mucous membrane, sometimes

great enough to seem as if it were trickling. Everyone, whether scientific or not, will experience a strong peristaltic movement, becoming so intense at times as to require instant evacuation of the bowels. Now, even were there no specific effect from electrization, in reduction of inflammation of the prostate, the relief of the bowels, in the case of a patient afflicted with prostatitis, without the use of laxatives constantly given *per oro*, is a great boon to him. The physical degeneracy from age,



The Prostatic Electrolyzer.

which usually attends disease of the prostate, is often associated with chronic constipation, so that it ought to be evident that a process which, without medicine, relieves the prostate from pressure by the fæces is a long step towards ameliorating its condition. But this is, after all, only incidental to the most important fact, that the current from the cathode or negative pole of the galvanic battery reduces the prostate. That the prostate is beneficially affected by it is evident at from pain; of the great solace imparted to the inflamed gland. Nothing can be a better test of efficacy of this sort than the sensation experienced, of relief from uneasiness, or it may be from pain; of the great solace imparted to the inflamed gland. The digital exploration of the physician will confirm in time what the patient has anticipated by a comfort which he had not for a long while experienced.

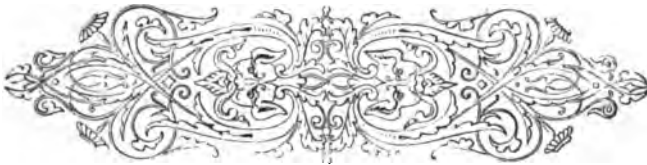
When, in 1890, the year when the "Prostatic Electrolyzer" was invented, I first wrote on this subject, I went minutely

into the question of strength of current to be applied, the length of time for its application, and other technical questions that might, perhaps, be interesting in the discussion of a new instrument. But, after all, consideration of these, reduced to a scientific point, may be omitted, for the whole procedure is determinable by sensation. The degree of inflammation of the diseased gland, the idiosyncrasy of the patient, intolerance of strength of the galvanic current, are the sole factors which properly determine what should be the intensity and duration of the current.

Nothing can be simpler than the mode of applying the "Prostatic Electrolyzer." The plan of it, herewith figured, all but affords a description of its mode of application. The sponge having been moistened, and the reophores attached to the anode or positive and the cathode or negative poles of the battery—the one representing the negative pole to the bulb-end of the instrument, the other to the opposite end—the instrument is ready for use. It is then passed from behind under the crotch, and its bulb inserted in the rectum to its full range by means of grasping the handle on its bulb end. The forward end of the instrument will then be hanging downward from the central hinge, with the reophore for the anode or positive pole dangling from it. It is then only necessary to attach this reophore to the battery to have all in readiness for the application of the current. The current is then applied by raising the front part of the instrument so as to bring the moistened sponge in contact with the perineum, where it is under perfect control through greater or less pressure communicated to the sponge by the handle of the forward end of the instrument.

All that has here been thus minutely described takes, in fact, but a few seconds to execute. An active patient, however, need take even fewer. He can bind both reophores to the battery and to the instrument, and then, stepping over the loop thus formed, with his back towards the bulb-end of the instrument, can insert the bulb in the rectum, raise the forward part of it until the moistened sponge is in contact with the perineum, and control the current by the manipulation previously described. The patient will, upon first feeling the current, experience a sensation of warmth in the prostate; but far more than mere warmth—a peculiarly soothing sensation, due to the molecular and chemical changes produced by the passage of the current

through the prostate. There can be no question, after twelve years' experience with this instrument that, whether to physician or patient, it is an appliance to be recommended. As for the patient, in whose behalf this account of it is indirectly written, the comfort which many have expressed themselves as having experienced from its use, makes it well worth while to direct the attention of the physician to a matter involving so much relief to the afflicted. The treatment itself has, it is true, been long known, but facility of treatment is always one of the prime factors in usefulness, and, therefore, it is to this point that I have spoken, in my duty as a physician to promote the adoption of the best methods and appliances for treatment in any branch of the medical profession in which they may have happened to invite my attention.



Editorial.

MEDICAL PROGRESS.

THE signs of the times denote a dawning of intelligent thought which runs counter to the relicts of ancient days. The greater intelligence of the masses is certainly overthrowing superstition, and the simple, all-abiding faith in the family doctor who is not progressive is sure to come to an end.

The mass of the profession is too slow in recognizing that as the broader dissemination of the knowledge of "how to live" and of what constitutes disease becomes the property of the layman, it will be necessary to meet the demands with rational measures. It is noteworthy, however, that many progressive physicians are beginning to investigate the employment of measures other than drugs for the relief of human suffering. Only the man who lives on in ignorance with eyes and ears closed to truth can honestly follow the methods of twenty years ago.

Probably the two most valuable rational therapeutic measures are natural ones—diet and exercise. These have been recognized for centuries, but too few physicians give them the thoughtful scientific study they deserve, and the medical colleges do not teach the subjects in the manner that their value and importance warrant.

Intelligent laymen have recognized their importance and have advanced more rapidly than the profession in the knowledge of these measures, which make the services of the physician less often necessary.

The physical measures, heat, light, electricity, and mechanical vibration, differ from each other in many characteristics. The three former fulfill the essentials of existence except the necessary nutritious pabulum furnished by diet and the atmosphere.

Mechanical vibration scientifically applied affords artificial exercise and local stimulation to nutritive processes and places

in the hands of the physician all that there is in osteopathy, and more.

Few indeed are the physical ailments other than those falling to the surgeon which cannot be relieved by one or more of the physical measures intelligently applied. Pain, nervous and inflammatory conditions, and specific processes yield to them to be cured and not palliated.

Another side of human nature, the psychical, has afforded the medical man and his placebos and nauseous doses many triumphs. But why the placebo and the bitter dose? The Christian scientists are sometimes successful and use neither, because they appeal to the natural instincts of the individual, employing a distorted interpretation of Sacred Writ as their authority for the marvelous things which they seek to accomplish. Probably no more dishonest, irrational and deceptive method has ever been instituted for the purpose of curing disease than that employed by this cult. But the suggestive influence used by them certainly does cure many patients of conditions after the pharmacopile has sadly failed. To the physician properly belongs the art of healing, but the judicious acceptance of facts and the adoption of rational measures demonstrated to relieve suffering should be adopted and the deceitful employment of placebos for purpose of suggestion must cease, or sooner or later the profession will lose the respect of the intelligent community. Instead of placebos, there are many rational measures upon which great stress can be laid, and rightly, as to their power of curing disease. If suggestion is valuable as a therapeutic measure, as all well-informed physicians acknowledge it to be, let it be taught and practiced scientifically, not as a deceptive means, and the dignity of the profession will be preserved, and thereby maintain instead of lose the respect of the intelligent.

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METASTASIS.

CURRENT literature contains many statements adverse to the employment of the X-ray, generally contributed by editors and practitioners unfamiliar with its properties and uses, or surgeons who prefer to do the work themselves. It is a well-demonstrated fact, however, that the X-ray has established its

value as a therapeutic measure beyond question. It has recently been said that the X-ray causes metastasis. How can it be affirmed that the X-ray causes metastasis because metastasis occurs with the ever indefinite *post hoc, propter hoc* of medical science? The number of cases of malignant disease which were not inoperable, except superficial epitheliomas, that has come under the X-ray treatment to the present time is small indeed. Most of these patients have been in the hands of the surgeon, and every gland in the vicinity of an infected structure has been removed, and recurrence has taken place, which has been the rule with cancer during the past history of the disease. When the X-ray, then, is called into requisition, it is as a *dernier ressort*. When the patient is then on the verge of metastasis and the glands which guard the extension of infection have been removed. Coincident with the treatment, metastasis occurs, and the X-ray has caused it.

The character of the vibration of the X-ray is not of that gross stimulating sort which tends to drive infection into other regions; on the contrary, its action is to destroy foci of infection, breaking them down, producing instead of metastasis a degree of auto-infection not characteristic of the disease, but from absorption of toxins.

Metastasis has not been demonstrated to be the result of the auto-infection produced by destruction of the local processes, nor, we believe, has it ever been truthfully affirmed that it has arisen from the action of the X-ray. It is the voice of the opposition, the unsophisticated argument of those who know little of its workings.

When cancer is systematically exposed to the X-ray before and after operation, there will be fewer deaths and greater success from the combined use of the knife and the X-ray.

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THE next annual meeting of the American Electro-Therapeutic Association will be held at Atlantic City, N. J., on Tuesday, Wednesday, and Thursday, September, 22, 23, and 24, 1903.

Progress in Physical Therapeutics.

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

Dacryocystitis. By E. E. Clark, M. D., Illinois Medical Journal, Springfield, February.

Clark remarks on the paucity of the literature of this subject and suggests that lack of a plan of treatment may be the cause. The method he has employed has been the use of chlorid of zinc. He reports two cases. In the first, other measures failing, he injected into the sac three drops of a twenty per cent. solution. There was violent reaction, but the treatment restored absolutely every function of the drainage system permanently. He would hesitate to advise so strong a solution as this, feeling that one would be safer in not going over ten per cent. Froelich, who recommended the method, used a five per cent. strength. His results make him enthusiastic as to this method of handling dacryocystitis.

Prostatic Calculi, with Report of a Case. John E. Erdman, M. D., Medical News, February 7.

These concretions are generally of large size, and do not much disturb micturition or the bladder, but may cause cystic abscesses. The author of the article advises the removal by operation.

An Improved Method of Testing for Lead in Urine. F. H. Jacob and S. R. Trotman. British Med. Jour., London, January 31.

The test is electrolytic. The delicate manipulation consists in evaporating about 250 c. c. of urine in a porcelain dish with a few c. c. of lead-free sulphuric acid placed over the flame, and about five grams of potassium persulphate are added little by little, with occasional stirring, as the temperature of the liquid is gradually raised. In about half an hour the contents of the dish will have become almost colorless, owing to the oxidation of the organic matter. When the liquid is concentrated to about 50 c. c. it is introduced into a platinum dish and an electric current passed through it for about eight hours. Before beginning, the poles are tested by introducing the terminals into a salt solution containing a few drops of phenolphthalein. After allowing the current to run for a sufficient time, the liquid is poured away and the dish well washed with distilled water. Hydrochloric or nitric acid is then added and, after digesting in a water bath or heating over a Bunsen flame,

a stream of sulphuretted hydrogen is passed through the liquid. The quantity of lead present can be accurately determined by matching the color with the standard solution of lead nitrate. Great care should be used in obtaining lead-free sulphuric acid, and all material should be tested. In this way they have detected the most minute quantities of lead when other tests have failed.

Irrigation in Acute Urethritis. Arthur L. Chute, Boston Med. and Surg. Jour., February 12.

This treatment has many advantages, and the reminder is very timely. Some years ago a military surgeon gave his experience with this method of treatment. He placed the soldiers affected with gonorrhea in bed in his military hospital, and had means for constant irrigation of the urethra arranged. The result was a cure in about one week, without any unpleasant sequels. An irritation may also be effected by a siphon arrangement, the nozzle being introduced into the urethra less than two inches, which has the advantage of not hurting the urethra in its inflamed stage. The irrigation will go down to any depth by the gravitation of the fluid through the siphon arrangement.

Residual Urine. Henry E. Hale, N. Y. Medical Journal, February 14.

This article suggests that in many cases the cause of residual urine may be enlargement of the middle lobe of the prostate behind the internal orifice of the urethra, and that the patient can be relieved if told to void urine twice daily in the knee-elbow posture. He has a patient nearly eighty-two years old who for the last thirteen months has found this practice of great service. After the bladder wall has lost its tonicity, this will be of no avail; it is only in the earlier phase that it is valuable.

The suggestion is very good, but it covers only one cause, that of having residual urine, and there are many other reasons for residual urine, and many complications of other diseases accompanying it.

Notes on Urinary Chemistry. Walter G. Smith, The Practitioner, London, February.

This is a report of only one unusual case. The author remarks that he does not know of any previously recorded cases in which it appeared in such quantities not associated with tyrosin. The patient had simply apparent digestive disorders and a frequent desire to urinate. The second part of his article is on the reaction between urea and formaldehyde and its clinical significance. The reaction consisted in a white

deposit consisting of discoid, very small oblong and oval bodies, single, or arranged in pairs, somewhat resembling large bacteria. The chemical study of the substances leads him to formulate the following three points of practical interest as regards relation of formalin to the urine:

1. It yields with urea a white precipitate (probably methylene-urea) which might easily be mistaken for leucin.
2. If present in urine formaldehyde will reduce the copper test, and so introduces a fallacy in testing for sugar.
3. Formaldehyde interferes with the detection of small amounts of albumin by means of heat and acetic acid.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Roentgen Rays in Rhinology.

In the Chairman's Address delivered before the Section of Laryngology and Otology at the Fifty-Third Annual Meeting of the American Medical Association, Dr. G. Makuen called attention to the value of the Roentgen rays in rhinology. Mr. Lawrence, of London, reports a case of improvement of that rare condition, tubercular rhinitis, by the application of the Roentgen rays, treatment of which has proved to be of value in cases of lupus of the skin, and Mr. de Santi two cases of lupus of the interior of the nose, one treated by the Roentgen rays and the other by the internal administration of urea, ten grains to the ounce of water, combined with local curettage and lactic-acid applications.

The X-ray has also been used by Dr. John H. Phillip to determine the location and size of the frontal sinuses, and the importance of this procedure is well illustrated by a case reported by Dr. Jonathan Wright, in which, the frontal sinus being absent, the frontal bone was perforated and the dura mater wounded with disastrous results.

Results of the Treatment of Laryngeal Cancer by Means of the X-Ray.

A case of epithelioma of the larynx is reported by Delavan (Laryngoscope, December, 1902). The patient, a man of sixty-five years, had a chronic nephritis, and was rheumatic. His voice becoming hoarse, his throat was examined and a large mass, apparently epitheliomatous, was found springing from the right side of the larynx. There was much infiltration of the posterior commissure and beginning involvement of the opposite side of the larynx. The glands of the neck were

involved on both sides, as was the inferior part of the lateral wall of the pharynx. The case was clearly inoperable, on account of the wide distribution of the disease, the condition of the kidneys, and the age of the patient. In order to eliminate the possibility of the lesions being specific, the patient was placed upon the iodide of potassium in moderate doses. The result of this was promptly disastrous, for within a few days he developed sudden œdema of the larynx with urgent dyspnœa and his life was only saved by instant tracheotomy. During the winter the growth in the larynx and neck increased enormously in size. In March he was placed under the care of Dr. Morton for treatment with the X-ray. He submitted to about eighteen exposures. After the first few treatments the growth seemed less tense and began to soften at its middle and to harden at one end. Soon the entire contour of the growth seemed to change. Later it seemed that the mass was breaking up, as there was a distinct attempt at the separation of one segment of it from the other. At this period treatment had to be abandoned and the patient shortly afterwards died from Bright's disease.

There appeared to be no doubt that the mass became smaller and softer after about two weeks' treatment, and that the patient had been distinctly benefited.

What Means, other than Operation, Have We for Preventing and Combating Inflammation of the Mastoid Cells?

Where there is danger that the mastoid cells may have become infected, Samuel Theobald, Baltimore (*Journal of Ophthalmology, Otology and Laryngology*, September, 1902) advocates the use of an antiseptic solution, which is to be used at home two or three times a day, giving preference to a solution of bichloride of mercury 1 : 8000 to 1 : 400 and a saturated solution of boric acid.

Where, however, the infection is due to streptococci or pneumococci, this method is ineffective. Purgation by calomel is helpful. Occasionally, where there is actual pus to be freed, paracentesis is necessary. The treatment should be commenced as soon as possible.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

X-Ray in Tuberculosis.—J. Edward Stubbert, M. D., in the *Journal of the American Medical Ass'n*, December, 1902.

The doctor discloses to some extent the arc light in the treatment of tuberculosis, which he finds of some benefit, but treats of the X-ray at considerable length. He considers it of

much value in the treatment of pulmonary as well as local tuberculosis and carcinoma. Satisfactory results having been obtained in internal carcinoma, he sees no reason why it should not be equally as effective in pulmonary tuberculosis, at least one of the most valuable agents.

"The X-ray as a Therapeutic Agent" is the title of a paper read by Dr. V. L. Brokaw, and published in the *Alabama Medical Journal*, January, 1903. He publishes about twenty illustrations of his cases, which are very excellent, and his results seem to be all that could be expected. A good deal of stress is laid upon the vacuum of the tube, and seems to prefer a tube of high vacuum instead of low, differing from most men in the West, where the low tube seems to be preferred. He advises the tanning of the parts to be treated, and then using a high tube to attack the growth, and believes that the healing commences from the periphery, not from the center. He concludes as follows: "For the present, the X-ray treatment of internal visceral growths is in the experimental stage."

"The treatment of surface or external milignant processes has rapidly emerged from the experimental stage, and in all early stages of external epitheliomas, carcinomas, rodent ulcers, and cases of lupus, a cure may confidently be expected."

Results of X-ray Treatment. By Dr. P. R. Turnure, Med. Record, February 7, 1903.

The doctor gives a summary of 94 cases of malignant diseases treated during the last two years.

His method of treatment is to expose every day for one week, every other day for one week more, and then rest the cases for two weeks; after which he resumes the treatment as at first. He uses a low tube of large volume and a powerful coil. Five cases of epithelioma of the nose are some cured and others doing well.

Of three cases of epithelioma of the lip, one did badly—sloughing wide and deep.

Two cases of cancer of the penis were treated, one having recovered. He thinks the effect in all the epitheliomata were good, and that X-ray is indicated in these before operation. In carcinomata his results were quite different, as all of his 15 cases of the neck and breast were failures.

He reports three cases of tubercular glands of the neck in children greatly improved, but attributes it mostly to the good attention received in the hospitals—not so much to the ray. Two cases of tuberculosis of the larynx were treated from four to six weeks without improvement.

Two cases of lupus, several cases of eczema and superfluous hair were treated with success.

In discussion of the above paper, D. H. Lilienthal says he

has seen epithelioma cured by X-ray, but has never seen a deep growth cured by X-ray alone, but reports a case of sarcoma of the scapula which was doing nicely and had every appearance of recovery, being treated by the ray in conjunction with the Coley toxin.

Dr. R. T. Morrios thinks that the ray should be used only in the inoperable cases, although he reports a case of epithelioma of the lip which was too far advanced for operative measures cured by means of the ray.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

X-rays in Surgical Diagnosis —By Arthur T. M'Cormack, M. A., M. D., *American Medicine*, January 24, 1903.

While it is possible, owing to the initial cost of the apparatus, the cost of maintenance, and the technical and electrical difficulties in the management of even the most improved machine, that X-ray machines may never become so universally employed as some of the cheaper instruments we now have, e. g., the stethoscope or thermometer, yet I venture the prediction that within a few years no medical or surgical diagnosis in any but the plainest cases will be considered definite or complete without a report from a reputable, competent radiographer. Of course we are but at the threshold of our knowledge of this agency, but even now Williams is able to make a positive diagnosis of the beginning of tuberculosis long enough before physical signs can be found to make the difference between success and failure in the treatment of this most common and most dreaded disease, while Leonard has taught us not only to make an absolute positive or negative diagnosis of renal or ureteral stone, but at the same time to locate it so definitely that the danger of the surgical procedures necessary to its removal is reduced to a minimum. The methods of these masters of our art are placed freely at the command of all medical men, and it is only he who will not, who fails to avail himself of their assistance.

First, it may be better to give brief attention to the machinery and technic necessary for the production of X-rays of sufficient brilliancy to produce satisfactory results. I have used both the coil and static machine, and while I freely admit that excellent results may be obtained from either, I feel confident that to any other than the X-ray specialist, or one who employs an operator, that the well-built static machine of 10 or more revolving plates equipped with a first-class motor of sufficient power to get a very rapid revolution of the plates will be more satisfactory than any other form of apparatus. In country districts, where neither water nor electric power

can be obtained, no static machine will be found satisfactory unless a small gasoline or steam engine is purchased with them. It is very tiresome to turn even the lightest machine by hand-power, and the light thus generated is an uneven one at best. The only troublesome thing one must do with a static machine is to keep several bowls of perfectly dried calcic chlorid in the case, and in very warm wet weather—during dog-days, for instance—these bowls must be set in the stove and baked for some time, until perfectly dry. Sometimes during the summer this must be repeated as often as every second or third week, but ordinarily once every month will do until the house begins to be warmed by artificial heat, when the bowls may be left alone until summer again. Much of this trouble, and it sounds worse than it is in practice, may be avoided by having glass plates six or eight inches thick under the legs of the machine.

In practice the question frequently arises as to whether the examination should be with the fluoroscope or whether a radiograph should be made. It seems to me that no X-ray examination, especially in surgery, is complete unless the fluoroscopic examination is especially thorough. In all cases when a permanent record is desirable, as in operative cases, or in cases in which one is observing new growths of sufficient density to show on a plate, it is well to make two or more pictures at such angles as will best show the deviation from the normal. Each plate should be definitely identified and the distance of the plate from the tube noted as well as their position relative both to one another and to the object radiographed. In medico-legal cases this is of especial importance, and the time seems almost at hand when the evidence in many personal injury cases will be considered incomplete without the testimony of a radiographer.

In considering the X-ray in surgery proper, we more easily understand our object by considering it (1) in bone surgery and (2) in surgery of the soft parts. We may for further convenience divide (1) bone surgery into (a) fractures and dislocations, (b) new growths involving bone, (c) diseases of the bones other than new growths, and (d) the detection of foreign bodies contained within bones or bony cavities; and (2) surgery of the soft parts into (a) the detection of foreign bodies in the soft parts, (b) new growths, (c) affections of the organs within the chest other than new growths, and (d) renal, ureteral, vesical, and hepatic calculi.

Fractures and Dislocations.—In the treatment of this particular class of afflicted persons Roentgen's discovery revolutionized at once our methods of diagnosis and treatment. It makes both so accurate and so safe that diagnosis in all cases in which it is available is certain, and the prognosis and treatment are laid before us as an open

book. Of course, many fractures and dislocations may be detected and treated almost perfectly without the aid of the X-ray (but we cannot safely tell which these are without their use), and I feel confident that if two radiographs could be taken, or even if sketches of the position of the fragments could be made from a fluoroscopic examination, and this could be repeated after as complete reduction as possible, the physician would know almost perfectly the amount of displacement that probably would result. This could be shown and explained to the patient, and the necessity, should it exist, for wiring the fragments together could be made plain. Fluoroscopic examination should be repeated frequently and each observation should be carefully recorded. Many linear fractures without displacement can be recognized only from a radiograph. Every user of the X-ray must be surprised especially at the frequency of fracture of small bones of the hand and foot in cases formerly treated as sprains, and they are of particular value in fractures complicated with dislocations when one or the other injuries are frequently overlooked by ordinary examinations. Most fractures in which there is great danger of permanent deformity are easily recognizable from a simple fluoroscopic examination, and the method necessary for relief lies before one.

New Growths Involving Bone.—In such conditions the value of the X-ray is apparent. It is well to remember that exostoses following fractures simulate new growths and that the growths are nearly always a little more extensive than they appear, owing to the comparative softness of the edges of the growth. Frequently the entire area of the growth shows only as a dark spot on the negative, due to the rarefaction of the bone and the lower density of the tumor. Radiographs should always be made in suspected malignancy.

Diseases of Bones other than New Growths.—In simple periostitis the edges of the bone appear roughened. The bone should be examined around its whole circumference very closely. In tuberculous infection of the joints the infusion is apparent and is always darker when purulent than when serotic, and the affected bone areas are roughened and less dense. In poliomyelitis of the long bones the borders of the canal are roughened. Of course the distinction between various bone lesions, whether tuberculous, syphilitic, malignant or simple, must be cleared up by the physical examination and history of the patient.

New Growths.—The size and depth of many new growths of soft parts may be marked out very definitely by the X-rays. Particularly important, as modifying the character of operations, is the location of growths of some size in the neck as to whether they extend behind the clavicle and into the thorax. Several tubes of varying degrees of resistance should be used

in such cases. Even large abdominal tumors cannot usually be made out, but the displacement of the diaphragm is always noticeable. Aneurisms may also be considered under this head for convenience: they are usually very dark and their pulsations easily noted.

Affections of the Organs within the Chest other than New Growths.—No examination of the chest may be considered complete without the aid and confirmation of the fluoroscope. Many examinations of normal as well as abnormal chests are necessary for one to appreciate this fact. Surgically we are chiefly interested in empyemas, pleurisy with effusion, gangrene of the lung, and tuberculosis. Dr. Williams, in his extraordinarily complete work on this subject, has shown that in all affections of the lungs the diaphragm on the affected side has a relatively lessened range of motion as compared with the sound side. Darkened areas in the lungs indicate disease of the lung substance, while cavities and emphysema are shown by clear bright spots, or in the latter disease over all of both lungs. Pleuritic effusions are readily noted by the displacement of the lung and often also of the heart. In empyema the resistance to the light is much greater and the area filled with pus is almost or quite black. Gangrene of the lung is similar in appearance to pneumonia, but the area is usually larger and darker. Displacement or enlargement of the heart may be readily noted and given its proper significance.

Thus briefly have I outlined the present status of the X-ray in surgical diagnosis. Truly we may say we are but in the infancy of this most wonderful art. Every day is bringing newer uses for the X-ray in all branches of medicine. No conservative expert will claim that everything in medicine is settled by its use or that any agency we now have at our command should be discarded. It makes a most—may we not say the most?—valuable addition to our diagnostic armamentarium and its very value makes it more important that we should more frequently examine the sputum and the blood, that we should all the better ground ourselves in the use of the stethoscope and microscope, that we should collect and keep more careful histories and case notes, and above all that we be better, broader, more careful, and more painstaking physicians.

THERMOTHERAPY.

EDITED BY CLARENCE EDWARD SKINNER, M. D., LL. D.

Hot Baths in the Treatment of Fevers, More Particularly in the Case of the Aged, Debilitated Persons and Children.

By George I. Bluhm, the Medical Fortnightly for January 10, 1903.

Dr. Bluhm first calls attention to the fact that in ancient Rome the advocates of hydrotherapy, in the treatment of fevers,

were divided into three classes—the thermophiles, who used *hot* water, psychophiles, who preferred *cool* water, and the psychrolites, who immersed their patients in *cold* water. The latter is the only method in vogue to any extent to-day.

In discussing it, he says, "Both Brand and Von Ziemssen insist that friction must be continued as long as the patient is in the bath. If this be omitted, the patient is only chilled by the long and thorough contact with the cold water, and the subsequent dilatation of the superficial blood-vessels is delayed, or lost altogether, defeating the object of the procedure. Westbrook and Brickner (*Foster's Therapeutics*) also point out the fact that the immediate result of the cold bath on human temperature is a slight rise, due to the large amount of heated blood driven from the periphery into the internal organs. The temperature of the body in the course of an hour slowly falls. In part this is effected by the active dilatation of the blood-vessels of the skin following their early contraction, thereby carrying cooled blood to the internal part of the body, and in part to the opportunities of heat dissipation offered by the dilated vessels. We can readily see then that the beneficial results of the cold bath depend not upon the primary action—the mere reduction of temperature by the rapid abstraction of heat due to surface radiation—but upon the reaction, the dilatation of the superficial blood-vessels, and the heat diffusion. Therefore, a patient who does not react from the first shock must and will be greatly harmed by the cold bath. I have observed that debilitated persons, the old, and especially children, do not react very well to the cold bath. They seem to lack the natural rebound which is necessary to prevent congestion of a permanent nature, after being subjected to a cold plunge. Furthermore, in a majority of instances in private practice, the cold bathing cannot be carried out, due to prejudices on the part of the parents or relatives.

Again, if we are to be guided by the sensations of the patients, the cold bath is certainly cruel in the above-named instance. Every one of us knows how bitterly those patients complain while in the bath or cold pack. Some beg to be killed outright, rather than inch by inch. The shivering and the cyanosis of the little ones appeal to us for sympathy."

Dr. Bluhm describes the technique of the hot bath applications advocated by him as follows: "The bath having been prepared at 90° F., the patient is immersed in it. The water should cover all of the body to the head, which should rest on a pillow. (2) By the addition of hot water the temperature is gradually increased to about 103° F. This temperature is kept up for about ten minutes; then (3) by the addition of cold water the temperature is gradually lowered to 90° F., or even to 85° F., being guided by the sensation of the patient. Then he is removed to bed, wrapped in a dry sheet, and covered with

a light blanket. Food and some stimulant is given after the bath. A handful of mustard put into the bath helps to produce cutaneous hyperæmia. A slight rubbing of the limbs and trunk is kept up during the first and third stages of the bath. A drink of cold water should be offered to the patient during the second stage. It will help to bring on perspiration by causing contraction of the blood-vessels in the center of the body, and the blood rushing to the surface stimulates the sweat glands to activity. The perspiration is very essential, as it will, among other things, abstract heat and prevent overheating. Currents of air should be carefully guarded against. The air of the room, if possible, should be at about 70° F. The bathing can be repeated two or three times a day. Reviewing the immediate effects of this bath, it will be seen that the first two stages are devoted to opening and stimulation of the pores of the skin. A physiological dilatation of the cutaneous blood-vessels is brought about. The skin becomes somewhat hyperæmic, congested, and soft; it contains more fluids, and it becomes a good medium of exchange of heat. Through the sweating heat is abstracted, and the moistened epithelium favors an increased heat excretion and dissipation. The last stage of the bath is devoted to the contraction of the open pores and their supplying blood-vessels, thereby preventing the gradual chilling of limited areas, which might result in internal congestion. The latter is still further guarded against by the alcoholic stimulant after the bath, and by the blanket. If properly carried out, the action is certain and the effect durable. In this manner everything which is claimed for the cold bath seems to be obtained.

The advantages dependent upon this method of treating fevers are stated to be as follows:

1. Increased elimination of toxic matter through the skin, kidneys, and lungs.
2. Relief of congestion of internal organs through dilatation of the integumental blood-vessels.
3. The induction of cerebral anæmia, whereby refreshing and physiological sleep is favored.
4. The production of nervous sedation and analgesia of varying degree.
5. Cardiac stimulation through dilatation of the circulation, whereby the strain upon the heart muscles is relieved.
6. It is agreeable to the patient, hence never causes the injurious excitement frequently provoked by the apprehension of the cold bath, and its use is never followed by cyanosis.

Superheated Air Therapy.

Grunbaum points out that higher temperatures can be attained with hot air than with any of the other local applications of heat. With water the highest limit that can be

reached without burning the tissues is 40-50° C.; with peat or fango, 45-55° C.; with steam, 50-60° C.; with sand, 55-65° C.; but superheated air can be borne at a temperature of 80-90° C.; equivalent to 194° F.—*Jour. A. M. A.*

The gratification of our trans-Atlantic colleague at being able to apply a temperature of 194° F. through the medium of dry hot air, assumes an aspect of *naïveté* when it is remembered that upon this side of the water no thermotherapist ever considers an application at all efficacious if the temperature is less than 250° F., and nearly all of us consider that our patient is not getting his due in the way of benefit unless he is treated at from 300° F. to 450° F. It is probable that Professor Grunbaum's hot air was not actually *dry*, or that he treated his patients without the use of wrappings, in which case the evaporation of the perspiration from the skin would not of course proceed with a proper degree of rapidity, and a temperature of 194° F., would be about the limit of intensity which could be used without blistering. The wrapping, which should always be employed, acts by absorbing the perspiration as fast as it is excreted, thereby distributing the moisture through the meshes of the fabric and offering a large surface for evaporation to proceed from.

C. E. S.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Stimulation of Glandular Activities.

If there is any one thing certainly settled in hydrotherapy it is the fact demonstrated by careful investigation and constantly exhibited in daily clinical work that the action of water applied to the cutaneous surface stimulates all glandular activities. This is markedly noticeable in the secretory activity of the skin, gastric mucosa, the entire intestinal tract, as well as the renal and biliary system. Many investigators have determined the fact that there is increased elimination of CO₂ and increased absorption of oxygen, and not only is this true qualitatively but also quantitatively, for the increased quantity of blood traversing the pulmonary circulation furnishes an increased basis of gaseous exchange. It is interesting to note some of the conclusions reached by Dr. Charles E. de M. Sajous in the *Philadelphia Medical Journal* of March 7, 1903.

He states that in reading the literature of the ductless glands he was struck by the statement of the affinity of the suprarenal secretion for oxygen, and as a result of considerable investigation of the action of these glands he tells the deductions and results of his work. While the writer cannot agree theoretically with some of the deductions still they furnish interesting material for thought and reflection. Sajous reached the following final results. (1) "When the venous blood reaches the pulmonary alveoli the marked affinity of the adrenal secretion in the plasma for oxygen causes it to absorb this gas from the air; the CO₂ being forcibly replaced by oxygen is expelled with vigor and the red corpuscles immediately carry oxyhæmoglobin. (2) The physiologic function of the adrenal secretion is to loosely combine the oxygen in the lungs and endow the blood plasma with its oxidizing property. (3) The anterior pituitary body governs the activity of the adrenals and is connected with them through the cervicothoracic ganglia, the splanchnic nerves and the semilunar ganglia. (4) All general symptoms witnessed in disorders in which the blood is invaded by a poison of any kind, are in reality manifestations of over-activity, insufficiency, or inactivity of the adrenals. . . (5) The power of the organism to antagonize the constitutional effects of pathogenic germs, their toxins and other poisons, is directly proportionate, all else being equal, to the functional efficiency of the adrenal system."

It may be that these studies offer an interesting and physiologic explanation of one of the reasons why mechanico-therapy accomplishes so much good in those conditions in which toxins endogenous and exogenous are present. Time and again has the writer had the opportunity of observing, not only clinically but by quantitative estimation of the alloxuric bases and purin bodies, the inefficiency of many of the vaunted medicinal remedies for the relief of these conditions and the common experience of the efficiency and activity of thorough, painstaking, and carefully applied hydrotherapeutic treatment. I do not wish to be construed as meaning that this result is limited to hydrotherapy; in fact, the results are more easily attained, the action of baths enhanced, and cure of the other remedial agencies, namely, diet, exercise, mechanical vibration, massage, electricity, hydrotherapy. The increased

circulatory activity, carrying, as it must, the various internal secretions and stimulating the internal glandular organs to further and increased function, certainly must hasten and bring about with rapidity the results that are to be expected from medication directed toward the stimulation of their various activities. Be that as it may, another fact will stand out clearly and distinctly; that no matter what medication may be administered its absorption and physiologic action are enhanced by the application of this remedy to the cutaneous surface.

C. P.

Hydrotherapy in Neurasthenia.

Baruch (St. Louis Medical and Surgical Journal) states that neurasthenia offers a fruitful field for hydrotherapy. From actual observation it has been found that in a large proportion of neurasthenics, if there be no organic basis nor positive hereditary predisposition to insanity, the result of a methodical course of hydrotherapy in connection with properly adjusted diet and environment will prove a revelation. The most useful procedures are the dry pack, which consists of a snug wrapping of the patient in heavy woolen blankets for about an hour, so as to accumulate heat. Successive parts of the trunk are then uncovered, and then treated to a rapid and brisk rubbing with a bath glove or wash rag squeezed out of water at eighty-five degrees. After drying and good friction the patient is sent into the air for gentle exercise. Every day the packs and wet rubbing are repeated, the water temperature being reduced two or more degrees daily until sixty degrees are reached.

The patient's reactive capacity having been trained by these daily neuro-vascular gymnastics, he is subjected to more decided hydriatic procedures. Standing in water at one hundred degrees in a warm bathroom, the patient may be subjected to effusions. From a foot tub containing water at eighty degrees, which may be daily reduced two or more degrees until sixty degrees are reached, water is dipped with a long-handled basin or large tin dipper, and thrown with force upon the upper back and successively over each shoulder and anterior part of the body. If this be done rapidly, followed by rapid drying, dressing, and exercise, the patient will not become chilly. Every day larger quantities of water may be used, always avoiding chattering of teeth and cyanosis, but not desisting because the patient complains of feeling cold or chilly. These and other home procedures, applied with due regard to the patient's reactive capacity, and as carefully supervised by the physician as he would supervise the ad-

ministration of any powerful medicinal agent, will bring relief, and, perhaps, entire recovery to a large proportion of cases.

The Administration of Calcium Salts in Nephrolithiasis due to Uric-Acid Calculi. By Alfred C. Croftan of Chicago, Journal of the American Medical Association, Chicago, March 28, 1903.

Phosphoric acid forms three salts with sodium, (1) mono-sodium phosphate; (2) di-sodium phosphate, and (3) the tri-sodium phosphate. In the urine we find normally the mono- and the di-sodium phosphate. Uric-acid is soluble in di-sodium phosphate, but it is not soluble in mono-sodium phosphate. Therefore the solubility of uric-acid depends upon the presence of a sufficient quantity of di-sodium phosphate in the urine. This can be accomplished in two ways, first, by decreasing the phosphoric acid in the blood entering the kidneys, second, by increasing the sodium in the blood; for the smaller the proportion of available acids to available bases the greater the tendency to the formation of basic salts.

First, the decrease of phosphoric acid in the renal blood. The phosphoric acid of the blood is derived from three sources, (1) phosphoric acid is ingested in the form of phosphates with the food, (2) the proteids, and especially the nucleo-proteids, contain phosphorus which is oxidized in the organism into phosphoric acid, (3) in a similar manner phosphoric acid is derived by the catabolism of the body-tissues.

We can control the first two sources of phosphoric acid by eliminating from the diet all the foodstuffs which contain phosphorus, but the third source of phosphoric acid can only be controlled indirectly, and this is done by the administration of calcium salts. Calcium forms with the alkaline phosphates in our food insoluble salts, and that is one way to prevent the absorption of this moiety into the blood; but much more important is, that calcium possesses a great affinity for phosphoric acid and combines with it to calcium phosphate. It will therefore not only attract the phosphoric acid derived from the disassimilation of the food-proteids, but also the phosphoric acid which is formed by the catabolism of the body-tissues. The calcium phosphates formed in this way are then eliminated from the body, but—and this is another important point—not through the kidney, as the other salts are, but through the intestines. The consequence is that the urine is not necessarily made alkaline.

Therefore calcium given by the mouth will first prevent the entrance of preformed phosphoric acid from the food into the blood, and, secondly, will prevent the phosphoric acid formed in the organism from passing into the urine by eliminating it through the intestine.

Second, the increase of the sodium in the renal blood. This object is best accomplished by the administration of sodium salts by the mouth, but, by so doing, the urine will be rendered continuously alkaline, and this is dangerous for various reasons, and will certainly occur if the doses of the sodium salts are large enough to convert all the mono-phosphate of the urine into di-phosphate. The normal urine is faintly acid and should be kept so. Calcium salts will never render urine alkaline.

Therefore the administration of large doses of sodium salts for long periods of time is not to be recommended, and in fact is superfluous, as the calcium salts, by decreasing the phosphoric acid of the urine, cause a relative increase of the sodium, without rendering the urine alkaline.

The author considers calcium carbonate the best preparation, and he gives it in doses of fifteen to twenty grains, three times a day. Von Noorden advises even as much as fifteen grams a day, and claims never to have seen any ill effects from this treatment. A more convenient form of administration would be in the way of natural mineral waters, as Contrexeville, Wildungen, and Fachingen. Among domestic waters the choice is difficult.

The diet of course takes an important part in the treatment of nephrolithiasis, and the author has treated this subject in a former paper: "The Modern Basis of Dietetic Treatment in the Uric Acid Diathesis."

In conclusion the author thinks it very important that no mistake is made in regard to the renal calculi being really composed of uric acid, and he gives his own method of easy and quick diagnosis. He reports four cases of his own and twenty-one of Dr. von Noorden's, which had been treated with calcium salts, and with two exceptions had shown marked beneficial results. Therefore he thinks that the treatment is very efficacious and deserving of further trial.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

Inasmuch as it is quite the fashion still for some of the would-be regulators of medical thought and progress to present the "cold shoulder" to psycho-therapy, minimizing its demonstrated capabilities, and denying its right to claim a place in the therapeutics of the future, the following may be worth noting. In the annual report of Dr. John Woods, Medical Superintendent of The Hoxton House Asylum, London, N., England, he says this:

"Having now treated over a thousand cases of disease by so-called suggestion I have, like Dr. Brammell, come to the conclusion that it is a potent remedy, and that much good may be done if rightly employed. It is commonly thought that only functional nervous disorders such as neuralgia, etc., are benefited by this treatment. This is not my experience, and my chief object in mentioning it is to draw attention to the fact that *it is applicable to a much wider field of disease*. . . . One word as to the necessity of sending the patient to sleep. This is, in my experience, by no means essential. I have cured most cases without."

Psychomotor Epilepsy. Boston Med. and Surgical Journal.

Dr. Ira Van Giesen of New York read a paper with this title. The work has been carried out at the Pathological Institute of the New York State hospitals under his directorship. The research consisted in reinstating into the patient's consciousness a series of upheavals of subconscious intervals accompanied by classical manifestations of epilepsy of which there was complete amnesia. The case related to a man, thirty-three years of age, who some months before coming under investigation had been having progressively frequent attacks of epilepsy and occasional attacks of petit mal. The attacks were preceded by an aura, consisting of a foul taste in the mouth, with a bad odor. At the time of admission there was also a tendency toward continuous amnesia in the epileptic interval. Under hypnosis patiently carried out, the patient succeeding in resurrecting the psychic content of the first attack, all of which it was possible to verify from eye-witnesses. It was found that the aura had its genesis in the patient's taking a piece of stale meat from a lunch counter and in his falling in the epileptic attack immediately afterwards. As one by one, starting from the first attack, the subsequent ones were thus synthesized into the patient's consciousness, the new attacks became correspondingly fewer. In all, about fifty of the attacks were reassociated with the patient's consciousness. As the series of fusion became complete, the attacks disappeared, the confusion and mild stupor in the interepileptic periods vanished, and for some months the patient has been back at his work and has had no attacks. The speaker announced that a volume of the Archives of Neurology and Psychopathology would shortly appear containing a detailed account of this case.

The Psychic Element in Hysterical Hemianæsthesia. Revue de Médecine.

M. Bernheim reports two cases which, added to other cases previously reported, he considers a proof that "sensitivo-sen-

social" hemianæsthesia may be directly added to hemiplegia by pure psychic dynamism. It may be initiated by medical examinations, which quite unconsciously make suggestion; it may be grafted by auto-suggestion upon a diminished sensibility due to organic causes, increased by psychism and transformed into complete anæsthesia; it may have a real organic origin from the influence of some neighboring lesion upon the intracerebral sensory tracts, but the functional trouble, which should be transitory, may survive the organic reality as a psychic image, retained by auto-suggestion. This may occur in patients who are not in the least hysterical. Psychic anæsthesia is not always hysteria.

MECHANICAL-VIBRATION THERAPY.

EDITED BY LUCY HALL-BROWN, M. D.

An Intractable Case of Singultus of a Year's Standing, Successfully Treated by Mechanical Vibratory Stimulation.
Reported by W. B. House, M. D., 203 West 113th St.,
New York City.

Patient Miss B. Age 20. Patient came to me for treatment March 14, 1903, with a clinical history which, briefly stated, is as follows:

In April, 1902, she began to have severe attacks of hiccoughs, with pains in the epigastrium, along the costal arch, especially over the *right side*. This continued without interruption (except during fragmentary periods when she was asleep) for over three weeks, when she was admitted to the hospital. At the hospital she was treated from May 17 to June 26, 1902, with various drugs, among which were strychnin, codeine, trional, chloral, paraldehyde, etc., also by rectal irrigations, all of which, while affording slight relief, never fully controlled the condition. She was also given faradic and static electricity, which the hospital records state increased the hiccoughs rather than diminished them. The hospital record is as follows:

June 10th. "In spite of medication, singultus continues at the rate of twenty to forty per minute. The patient is tired out, though she is able to sleep. There is considerable tenderness around the insertion of the diaphragm, especially on the right side."

June 17th, record says: "Patient has been smoking cigarettes for the past three days with marked diminution in the number of hiccoughs. It was found that smoking cigarettes was the only means that afforded even temporary relief from the seizures. Consequently, she was finally dismissed from the Hospital, June 27, 1902, with instructions to smoke cigar-

ettes when the paroxysms came on. This was continued at every recurrence of the paroxysms, which were almost daily, with the exception of two weeks, until she consulted me March 14th last, as above stated."

A careful examination of the patient, disclosed marked irritation at the right sacro-iliac synchondrosis, causing great contraction of the quadratus lumborum muscle. Following up the course of the muscle to its attachment to the last rib,* it was found that irritation of the diaphragm was conveyed reflexly through this means. The other points of reflex irritation were at the 12th dorsal and 5th lumbar spinal nerves. I determined to treat this patient, tentatively, by mechanical vibratory stimulation. The brush attachment, with medium stroke, was applied over the affected areas, and also over the diaphragm, as indicated on the accompanying chart.

Result of Treatment.—The first treatment relaxed the quadratus lumborum muscle with complete relief of diaphragmatic irritation. The hiccoughs were immediately suspended. The patient was given, in all, only three treatments, and has never since had the slightest suggestion of a recurrence of hiccoughs, although after the first treatment her cigarette smoking was wholly discontinued. The smoking has never been resumed. So far as her present condition enables me now to judge, she is *permanently* cured of her prolonged and troublesome singultus. A *symptomatic* cure resulted from the first treatment.

A Case of Retinal Anæmia—Treated Exclusively by Mechanical Vibration Applied Solely to the Affected Neural Areas of the Spinal Cord. Maurice F. Pilgrim, M. D., New York, from "Practitioners' Notes," February 28, 1903.

Illustrative as well as corroborative of my contention that many diseases can be most effectively treated through Mechanical Vibration applied solely to the nerve or nerve centers that control the nutrition and action of the affected organ, the clinical history of this case will be briefly recited.

Retinal Anæmia.—Miss T., age nineteen. Some months acuity of vision had been gradually but steadily declining. Eyes had been refracted by competent ophthalmologists four times within a period of five months, and glasses changed each time. At the time of examination by myself—October 6—her vision with her correction was 20-70ths in O. D. and 20-90ths in O. S.; was unable to read even for a fraction of a minute at a time. The print would "all run together" or else "melt away." Considerable pain was experienced in both eyes, espe-

* See Gray's Anatomy—"Action of quadratus lumborum muscle," under The Deep Muscles of Abdomen: "The quadratus lumborum draws down the last rib and acts as a muscle of inspiration; and, at the same time, by fixing the last rib, it opposes the tendency of the diaphragm to draw it upward, and thus it becomes an assistant to inspiration. . . ."

cially after attempting to use them, which was more or less constant and persistent. Ophthalmoscopic examination disclosed a very pale or anæmic eye-ground; caliber of blood-vessels contracted, and diminished red reflex of the entire fundus. It was a marked case of retinal and choroidal anæmia. Treatment was begun, tentatively, with vibration over the vasomotor area in the spinal cord which influences the blood supply of the eye—at the junction of the fourth and fifth dorsal. It was also applied to the third and fourth cervical, and over the sub-occipitals, for its derivative effect through relaxation of muscular contractures. Except on a few occasions (not over a half dozen in all, and then for only a few seconds) treatment was not applied over the eye-ball at all. Vibration was the *only* treatment employed. The second treatment relieved the pain, which was apt, however, to recur between the intervals of her visit to the clinic. Daily treatments were given after the first week. The improvement in vision was marked, and an entire change in the eye-ground was noticeable after the first ten days of treatment. At the end of treatment—November 20th—vision (with same glasses was O. D. 20-25ths, O. S. 20-30ths. No pain. Able to read for an hour without fatigue or discomfort. January 1st of this year re-entered school, and on February 22d reports that she is “keeping up” in her studies without any discomfort referable to her eyes.

BOOK REVIEWS.

CUSHNY'S PHARMACOLOGY AND THERAPEUTICS. A Text-Book of Pharmacology and Therapeutics, or the Action of Drugs in Health and Disease. By ARTHUR R. CUSHNY, A. M., M. D., Professor of Materia Medica and Therapeutics, University of Michigan, Department of Medicine and Surgery, Ann Arbor, Mich. Third edition, revised and enlarged. In one handsome octavo volume of 750 pages, with 52 engravings. Cloth, \$3.75, net; Leather, \$4.75, net. Lea Brothers & Co., Publishers, Philadelphia and New York, 1903.

This practical text-book, already in the third edition, shows careful preparation and attention to details. It has been the plan of the author to associate together those substances which have a common and allied origin. Many illustrations have been added to the new edition.

The book is written in a clear and concise style, and particular attention given to drugs of greatest value. Unfortunate it is that the Pharmacopœia is burdened with such a list of redundant drugs, and wise is the writer who will discriminate in favor of the useful remedies.

The writer has given notable attention to the action and effects of alcohol, for which the work will be highly appreciated. For a reference and text-book the work is cordially recommended.

THE CHILDREN'S HEALTH. By FLORENCE HULL WINTERBURN. New York, The Baker & Taylor Co., 33-37 East 17th St., Union Square, North. Price \$1.25 net.

This little work, written for the commendable purpose of the enlightenment of inexperienced parents for the children's sake, seems to have fulfilled the author's intention. Attention has been paid to all the attributes of the healthy form, grace, culture, and attainments of youth, and betokens an amount of study, experience, and good sense rarely to be found in works of the kind. It is a book which physicians can well recommend to the public for the benefit of the rising generation. It is hoped that the one who writes so well will continue to add to the literature upon subjects of so much importance to the lay readers of every generation.

THE MATTISON METHOD IN MORPHINISM. A Modern and Humane Treatment of the Morphine Disease. By J. B. MATTISON, M. D., Medical Director Brooklyn Home for Narcotic Inebriates. Published for the author. E. B. Treat & Co., New York, 1902. Price \$1.00.

This little book contains the result of treatment of Morphinism from the pen of one who has given the subject a careful and comprehensive study, and whose experience has fitted him to express himself authoritatively on the subject.

INORGANIC CHEMISTRY SYLLABUS. By HUBERT C. CAREL, B. S., Assistant Professor in the University of Minnesota. Third edition. Minneapolis, H. W. Wilson, Publisher, 1902.

This work is a clear, concise, and practical text-book for use for advanced students, and those who for reasons care to familiarize themselves with the subject of Inorganic Chemistry.

CLINICAL TREATISES ON THE PATHOLOGY AND THERAPY OF DISORDERS OF METABOLISM AND NUTRITION. By Prof. Dr. CARL VON NOORDEN, Senior Physician to the City Hospital in Frankfurt a. M. Authorized American edition translated under the direction of Boardman Reed, M. D., Professor of Diseases of the Gastro-Intestinal Tract, Hygiene, and Climatology, Department of Medicine, Temple College, Philadelphia. Part I, Obesity. The Indications for Reduction Cures. New York, E. B. Treat & Co., 1903. Price 50 cents net.

This treatise is the outcome of an exhaustive study of the disorders of metabolism and nutrition by the author and his students. The subject of obesity is treated in this small volume in a scientific, concise, and practical manner.

In his introductory chapter he calls attention to the too frequent practice of physicians to superficially and carelessly directing their patients to the various spas without reference to indications or the effects of the various waters. He lays down a general rule of action for men in the medical profession which might well govern the actions of all. He says, "It is important, above all, to know what we are trying to combat, why

we are combating it, and what we expect to accomplish by the method of procedure that we adopt. Not all patients should be subjected to reduction treatment. In some we should be content with preventing the further deposit of fat." The work is ably written and scientific, and will be read with profit.

SOCIETY MEETING.

MEETING OF THE CLINICAL SOCIETY OF PHYSICAL THERAPEUTICS.

THE PRINCIPLES OF TREATMENT IN DISEASES OF THE GASTRO-
INTESTINAL TRACT.

Dr. Sigismund Cohn was the author of this paper.

DISCUSSION.

Dr. H. Grad: I wish to speak solely on the surgical aspect of the subject. The reader of the paper said that surgical aid was to be called in when obstructions were present. Personally, I think there is a field for surgery in those cases in which a proper diagnosis cannot be made. This subject was brought before the American Medical Association at its last meeting by a gentleman from the South, who said he was able to give relief in a large number of cases when they were referred to him early. He had found that malignant disease in an early stage was amenable to surgical treatment. In the Cartwright lectures given a few years ago by Dr. W. W. Keen the same point was brought out; *i. e.*, that an exploratory incision is not only justifiable, but is actually demanded when a definite diagnosis cannot be made by other means.

It was my fortune to have a case of gastric ulcer come under my care which refused to heal under the usual methods of treatment. The vomiting and hemorrhages persisted, and it became necessary to do something else. I made an incision into the stomach, and found an ulcer not larger than a five-cent piece with a small artery in its center. I excised this ulcer and sewed up the stomach, and the patient made a prompt recovery. This operation was done four years ago. About two years afterward there were some symptoms of gastric ulcer, but they promptly subsided under appropriate treatment. I heard from this patient a year ago, and she was still well.

In 1895 Dr. Theodore McGraw found that a gastro-enterostomy could be made by the use of an elastic ligature. The method is so exceedingly simple that it quickly found favor. I have used it in two cases, in both instances for benign stricture of the pylorus. In one of the cases the pylorus was so

much contracted that if the patient would take a cup of coffee late in the evening, nearly one-half of this coffee would be found in the stomach the next morning. A fine silver probe was all that could be passed through the pylorus. In that case I did a gastro-jejunostomy because pylorotomy would have been a very serious operation on account of the patient's very bad condition. A gastro-enterostomy was done in the second case for what was thought to be a cancer of the pylorus, but the exploratory operation showed the stricture to be benign. In introducing the ligature it was found difficult to know just where the point of the needle was in the gut. To facilitate the application of the ligature I devised an appliance by which the point of the needle is concealed in a cannula while in the lumen of the gut. By the motion of a lever it can be projected at the desired moment. I take pleasure in showing you this device. In dealing with this subject, we must consider not only the disturbances of secretion of the digestive organs, but the size of the organ and its position. In dilatation of the stomach the organ sags down, thus allowing of stagnation of food. We can reduce the size of the organ by taking a pleat in it. Many successful cases of this kind have been reported.

Dr. William Benham Snow: I am sure we are indebted to the reader of the paper for the thoroughness with which he has covered his subject, one which is of great importance, and yet it is so very generally not well understood. It is reassuring to know that the time has come when these diseases are being thoroughly and scientifically studied. The subject has been presented to us this evening both from the standpoint of prophylaxis and from that of curative treatment. If the principles of the dietetic treatment were better understood and more exactly prescribed, much could be done in the way of prevention. I believe if less meat were eaten and more of the grosser foods, only taking enough proteid to satisfy the demands of the system instead of being governed by the individual taste, there would be far less disease of the gastro-intestinal tract. The author has rightly said that the medicinal treatment of these disorders occupies a very subordinate position, and wisely lays much stress upon the physical treatment by lavage, electricity, and similar procedures.

Dr. C. F. McGuire, of Brooklyn: I wish to speak of change of air as a factor in the treatment of stomach troubles. I had under my care at one time a lady suffering from stomach trouble. Her case proved most obstinate, and the physicians of several hospitals in Brooklyn agreed that she had cancer of the stomach. The woman then decided to go home to the old country, but her condition was such that the ship surgeon was not inclined to take her at first. However, she went home, and was entirely cured without further treatment. I have since had another case under my care, a woman of the lower class,

who would not consent to careful regulation of diet or to gastric lavage. A change of air was suggested, and she, too, returned to the old country, and after a year or two came back to this country, having been completely restored to health. The cases emphasize the very small part played by medicines in the treatment of these disorders.

Dr. Mitchell: I have learned something from this paper. There is no one practicing medicine who does not need to have a good knowledge of dietetics. In my specialty, gynecology, I find many patients will do well if I can restrict their diet. If you tell them that they can eat a little of this and a little of that, they invariably take too much; hence my plan is to restrict them almost exclusively to milk and water.

Dr. Maurice F. Pilgrim: I am disposed to think that in the cases reported by Dr. McGuire the cure was not so much dependent upon a change of air as upon a change of the habits of life. It is well known that epileptics are often greatly improved by a change of diet or habits of life, but eventually relapse into their former state. This explains some of the supposed effects of tenotomies on the eyes.

Dr. Josephine Griffith Davis: I know of a lady in this city who had had epilepsy for many years, and who was completely cured by tenotomy of the eye. That the cure has been permanent is shown by the fact that there has been no return of the epilepsy for a period of seventeen years.

Dr. Grad: I should like Dr. Cohn's opinion regarding the cases reported by Dr. C. F. McGuire as having been cured by change of air. I think it probable that these patients were sufferers from gastric ulcer, and having stopped work, taken a sea voyage, and had a complete change of the mode of life they recovered. Some years ago a gentleman read a paper on the subject of chlorosis and gastric ulcer, and he claimed that chlorosis did not cause the gastric ulcer, but that cases having chlorosis developed ulcers because in some way the hæmoglobin was deposited in the walls of the vessels, causing thromboses, thus allowing the areas supplied by these vessels being digested by the gastric juice.

Dr. Cohn: One of the most difficult diagnoses to make is cancer in the early stage. The diagnosis in the cases reported by Dr. McGuire may have been ulcer, chronic catarrh of the stomach, or even nervous dyspepsia. In prescribing a diet one should always follow the principles laid down in the paper. There must be a certain number of calories and a certain quantity of proteids, although for a limited time a diet below the standard may be used. I think, therefore, while persons may improve temporarily on a milk diet, such a diet is not suitable for long continuance. Cases of gastric ulcer should not be subjected to surgical operation unless they prove utterly rebellious to medical measures. The operation of taking a

pleat in the stomach would certainly reduce the size, but it would not cure the atony.

Dr. Mitchell: At one time I saw a man of splendid physique, a stone cutter by trade, who had been living for twelve months on a quart of milk and two quarts of water a day. For the first six weeks he suffered greatly, but after that, he said, he felt perfectly satisfied, and was able to continue at hard work. The object of taking this diet was to reduce his flesh, and he had succeeded in reducing his weight from 225 to about 165 pounds.

Dr. Cohn: This man had so much fat, such a surplus of potential energy, that he was able to live, so to speak, upon his own body. Even then it seems to me that it is very difficult to understand how he could obtain enough nourishment, and I am sure that this man ran a foolish risk. Habit, of course, plays an important part. The Japanese, for example, live largely upon carbohydrates, and take very little proteid, but these people are used to such a diet. I do not believe that a quart of milk in twenty-four hours is sufficient food if taken for a length of time. Some people cannot take milk at all, suffering either from diarrhea or constipation.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

THE ULTRA.

The aim in designing this apparatus was to get a lamp that would produce the ultra-violet rays in great abundance, with little or no heat and with few light rays, and at the same time be cheap, easy to operate, and use so little electricity as to be attachable to any electric-light socket. These aims have been accomplished.

The cuts show the entire instrument with the exception of the base of the stand. The whole outfit weighs about forty pounds, and with exception of stand may, when not in use, be packed in a nice mahogany box.

On the right of the box is situated a transformer, which takes the current as it comes from the lamp socket, transforms it to a much higher voltage, and charges a condenser in the base. The current as it leaves the condenser is of the high-tension, high-frequency variety, and is used in this form by the lamp.

This is really a diminutive arc lamp, mounted on a slate base, and protected by a nickel cover with a crystal lens. Instead of using electrodes of carbon, iron ones are used, producing the

true ultra-violet ray, when the high-frequency current is used to feed them.

Another important feature is that no water nor sewer connections are necessary or useful, as not enough heat is generated to be troublesome.

The cost of operating is not more than six or eight cents per hour. The lamp runs almost without noise, and owing to the



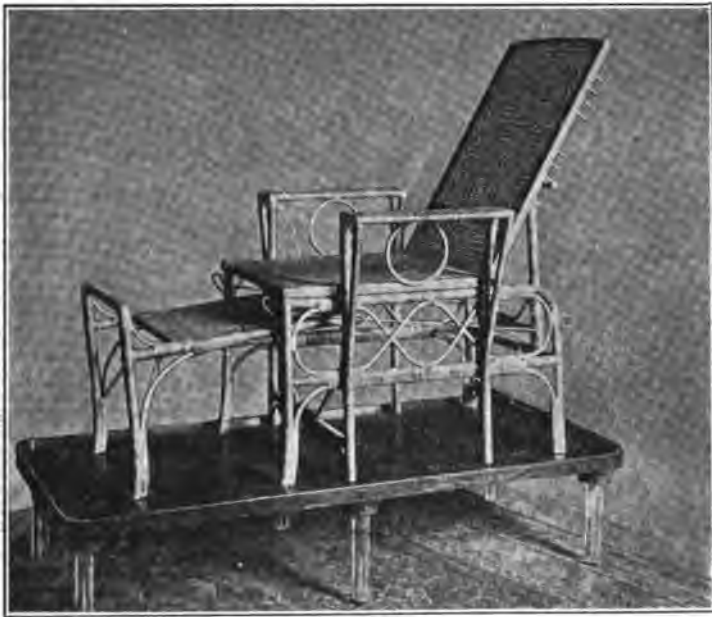
few light rays given off and the fact that the ultra-violet rays are invisible to the eye, the uninitiated might claim that no results are being obtained, but if a tungstate or calcium screen be placed in such a position that the rays will fall upon it, it will fluoresce brilliantly, or if a common incandescent lamp be placed in the rays, it also will fluoresce blue. This test must be made in a darkened room.

If the rays are allowed to strike on the bare skin for more than a few minutes, an intense erythema will be produced.

Glass is entirely opaque to these rays.

Users of the apparatus claim that the lamp produces at least twenty times as many Ultra Violet rays as the largest arc lamp now in use. This apparatus is manufactured by Swett & Lewis Co., Boston, Mass. Price, \$100.00.

The chair shown here is manufactured by the enterprising firm of C. W. and R. M. Bowen & Co. of Providence, R. I., and will fill a long-felt want. The back of the chair has been made high for two reasons: (1) that, with the pillow at the back, electrodes may be held firmly against the patient to the



neck, which is often necessary in cases of myalgia and other conditions calling for the effect over the cervical region, and (2) that it may be long enough when extended for the patient to lie down. The back is supported by means of a device by which it may be placed at any angle with the seat. Beneath the seat has been provided an extension which serves the purpose of stirrups or may be drawn out to support the extended limbs of the patient.

It will be observed that the chair thus arranged will take the place of the operating chair or table in the office and at the same time permit placing the patient in any position desirable for treatment. The chair is constructed entirely of bent wood, and is light, convenient, and attractive. It is sold for \$22.00.

SPECIAL DESIGNS OF VACUUM TUBES.

The above cut represents two new vacuum tubes designed for treatment of the ear and throat which are insulated over the



vacuum portion at the surfaces where they would come in contact with the parts which it is not desired to treat. These tubes are made from a design by Dr. A. Worral Palmer.

Fig. 2. represents vaginal and rectal high-frequency electrodes which are insulated over longer part of the extent of the vacuum of the tube, in order that the induced high-frequency effect will be produced only at the portion of the tube beyond



the part insulated. These tubes will be found effectual in making applications during periods of humidity and when employing machines producing a current of insufficient energy to give a marked local effect from a large surface. These vacuum tubes provided with insulation as above, meet the same requirements and more satisfactorily than the Geissler, in which the wire is insulated to a point near the end of the tube. The tubes are manufactured by E. Machlett & Son, New York.

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A VITAL PROBLEM IN THE PRACTICE OF ELECTRO-THERAPY.

BY MAURICE F. PILGRIM, M. D.,

*Professor of Psychiatry in the New York School of Physical Therapeutics; First
Vice-President of the American Electro-Therapeutic Association.*

Every physician who extensively employs electricity in any of its forms in the treatment of disease, soon becomes identified with it in the public mind as its especial champion. This is true even though he does not intend or desire to limit his professional activities to the employment of this particular agent exclusively. If he happens to be located in a small town, he may, for a time at least, have the entire field of electro-therapeutics to himself. But whether in a large or small place, both the practitioner administering it as well as the agent itself, in every new case undertaken for treatment, is actually on trial before the bar of the patient, his friends, and his family physician. If the treatment succeeds, electro-therapy, as well as he who administers it, scores a triumph. If, on the other hand, it happens through any cause to fail, the therapy, more than the physician who applied it, is amenable to disqualifying comment on the part of the patient and his friends, and they are usually not at all backward in bestowing it. Electricity, in the past, has had to contest for every inch of ground it has gained. If it had not possessed strong inherent curative properties, considering the empirical and crude methods of application from which the therapy may be said to have been evolved, it would long since have been consigned to an ignominious desuetude. That it has survived errors of theory and crudity in methods of application, or even no method at all at times, and has triumphed over the malingerings of the charlatan on the outside and its "fool friends" inside the profession is, I conceive, a high tribute to the mag-

nificent curative properties that inhere in this potent therapeutic agent. But, gentlemen, it is still on trial and, in a large sense, more now than ever before. The development of radio-therapy within the past two years has, it may fairly be said, actually forced electro-therapy to the front by the sheer force of its own momentum. It is interesting to note that where too little was once expected, there is now danger of too much being demanded. It is only the natural rebound from one extreme to its opposite.

All great successes may be said to depend upon the ability to recognize and utilize the opportunity when it is presented. After having extensively employed electricity as a therapeutic agent for more than ten years, I have yet to find, when it was judiciously applied to properly selected cases, it failing to demonstrate its usefulness, provided always that the requisite full and free opportunity to do so were given it. That the opportunity is not always forthcoming, every electro-therapist knows only too well. So long as patients regard electricity with slight esteem, they usually do not present themselves for treatment by it. When they do come, it is more often with exaggerated rather than with conservative estimates as to the rapidity of its curative power. Thus the therapy is liable to be, and frequently is, impaled upon the horn of either too little or too much expectation, neither of which is calculated to incline the patient to give it the fair opportunity that it has a right to and imperatively, demands. It need scarcely be said that the opportunity referred to, is only a synonym for persistency and regularity of attendance for treatment upon the part of the patient. Too often he confounds relief with cure, and is consequently disappointed when he discovers they are not interchangeable conditions, and disgustedly discontinues further treatment. Thus electricity as a potential curative agent, stands *pro tanto*, discredited. The patient came seeking cure—not relief merely—of a chronic condition and usually after having invoked unsuccessfully other means for its accomplishment. To interpose a treatment requiring persistence and the element of time against a condition of chronicity, is obviously in the direction of cure by the natural law of biological evolution. The cure of all chronic disease by whatever agency employed is secured in no other way in my belief. All “short-cuts” towards this desired end, are only modified at-

tempts at the performance of a miracle! Electro-therapy, whatever may be its other alleged shortcomings, repudiates all such claims or pretensions.

This, then, is *the* vital problem in the practice of electro-therapy—to which your consideration is invited—how when treatment is once begun, to “keep the patient at it,” so to speak, until it has had opportunity to disclose its curative possibilities in a given case. Desultory or irregular attendance for treatment, is futile. A few treatments when many are required, is so much time, energy and money (if the patient pays) wasted, with a beneficent therapeutic agent brought into discredit and dishonor. Thus the therapy is made unjustly to suffer reproach as well as the physician that employs it. This is no chimerical or imaginary picture. It is not a “straw man” set up for the purpose of stimulating a discussion upon a mere possibility. It is an actual—a real problem that confronts every person who employs electricity in the treatment of chronic disease. To illustrate: A woman consulted me recently with reference to the treatment of goitre by means of mechanical vibration. She confided to me that she had been treated, without benefit, by electricity “in all its forms.” Upon being pressed for particulars, she disclosed that the galvanic current had been twice applied, faradism once and suspended because it “hurt so,” and the static current three times, when she discontinued treatment because, in her vernacular, “it didn’t do no good,” and her family doctor said it was a waste of money to keep on! If this were not a story with unimportant variations as to detail, of frequent repetitions, your attention would not be invited to a consideration of the problem it suggests, at this time.

What is the remedy, gentlemen? How can a patient once having begun treatment for a chronic condition, be “held up to it,” until electro-therapy shall have been given the opportunity necessary as measured by time, to demonstrate its curative power? No more than could the children of Israel make bricks without straw, can electricity, no matter how skillfully administered, cure disease without the patient’s co-operation by regularity of attendance and persistence in treatment for a reasonable length of time. It is a problem that in importance outranks mere question of voltage, amperage, or choice of current or modalities. It has been said that the activity of

one enemy is equivalent to the combined exertions of five friends. The unsuccessful dabbling of one such patient with electro-therapeutics, is usually much more widely heralded than the cures of a half a dozen people! There is no undeviating *a priori* test of silliness. We cannot X-ray the gray matter of each new patient and so discover in advance and exclude from treatment, the ass or the fool. Without endeavoring to suggest or formulate a remedy that while effective, shall also be accounted ethical both in its spirit and application, the problem is now submitted to you, my colleagues, with the confident hope that its discussion by you will materially contribute towards its practical and proper solution.

DISCUSSION.

Dr. Clarence E. Skinner: This is certainly a vital problem, for everyone who has used electro-therapy has been exasperated by the desultory manner in which patients have come for electrical treatment. Many of them although told that they must come for three months will come for three weeks, and then abandon treatment. Personally, I do not see any way of overcoming this obstacle in every instance, but suggestions from those present are in order, and will be most welcome.

Dr. William Benham Snow: We should first get at the history of the case which comes for treatment, including the history of the patient's tenacity. Patients suffering from chronic conditions who have not shown enough determination in keeping to one method of treatment it is best to turn away. The patient should be told plainly at the outset in such cases that a considerable time will be required; when, if a cure is effected in a shorter time it will be appreciated all the more. I habitually tell my patients with locomotor ataxia coming for advice that the treatment must necessarily be very protracted for at least a year. Another plan is not to undertake the case without a substantial cash payment. The advantage of this is that it insures a certain amount of steady attendance and treatment, and gives the physician an opportunity to make some progress with the case. I recall distinctly a case which had come from a distant town in which I insisted upon this, telling the man that I must be paid for the first month's treatment in advance. He was cured in six weeks, and then told me frankly that if he had not made this payment at the outset he would have discontinued the treatment at the end of two weeks. This method savors of quackery because it has been one of the unfortunate traditions of the medical profession that payment is not sought for or demanded for a considerable time after rendering the service. While this method is an excellent one for securing

the faithful attendance of the patient, I am sure that if all electro-therapeutists adopted it they would, as a class, be looked upon even more suspiciously than they have been heretofore. To avoid opposition and arousing prejudice we generally avoid everything having the appearance of being unethical. After all, the best guarantee to patients is to have been referred to the physician by members of the medical profession whose confidence he has won by not having stolen the patient. Many of the chronic cases have been financially embarrassed before coming to the electro-therapist; when it is often wise to make the fee moderate and thereby treat the patient long enough to cure him, utilizing him as an example. In the interest of science and humanity many such sacrifices must be made and it will not be long before the value of electricity as a therapeutic agent will be recognized, and the oppositions of the professional skeptic who is the obstructing factor will be silenced. Results such as can be shown are all that is necessary to win the confidence of physician and layman. The time element, too, will be understood and patients will bide the cure.

Let the specialist be square with the general practitioner and he will be ever glad to send to him the class of patients he cannot cure because they are ruinous to his own reputation.

Dr. C. F. McGuire: It is necessary to educate the profession with regard to electro-therapy, for only a few days ago a physician of considerable prominence assured me that he firmly believed the effect of electrical treatment is purely psychical. If the profession can be made to understand the reality of electrical treatment, it will not take long for the laity to appreciate its benefits.

Dr. Josephine Griffith Davis: I think we should deal frankly with our patients, and speak plainly to them, explaining that if they are irregular in attendance the progress of their case will be retarded and that it will not only take more time but more money to effect a cure. In the case of a chronic disease, it should be made clear that much time and patience will be demanded both of the patient and of the physician.

Dr. Grad: We should follow the line of least resistance by impressing the medical profession with the fact that electricity is a potent therapeutic agent—in other words, it is by the education of the medical profession that we shall ultimately obtain the confidence of both the profession and the laity. Many patients come to the electro-therapeutist at the present time thoroughly imbued with the idea that electrical treatment savors of quackery, and they seek it only as a last resort.

Dr. Mitchell: It has been said that if we can get the patient we can hold him, but I have found that when relief is promptly given the patient is very apt to abandon treatment abruptly and prematurely.

Dr. A. W. Palmer: I wish to speak on this subject because I am not an electro-therapist. It seems to me that the reader of the paper is a little sensitive regarding the general opinion of the profession concerning electro-therapy. According to my observations the general opinion of the profession is becoming more and more favorable to that branch of therapeutics, because those who have entered the profession in recent years have had an opportunity of better education and of learning what can be actually accomplished by this mode of treatment. It is, of course, desirable to endeavor to size up the patient as accurately as possible; it is also well sometimes to be independent and to refuse to treat those who will not come regularly, explaining to them that their carelessness will injure your reputation, and you cannot afford that.

Dr. Skinner: We are confronted here by a condition rather than a theory. There are two elements. On one side the electro-therapist's reputation and vanity are concerned; on the other side is placed the welfare of the patient. If the latter fails to be benefited by electrical treatment, he will never try electricity again, although this may be the only means of giving him the relief he desires. The profession will be educated up to the proper point in the course of time, but until this desirable end has been reached we shall be compelled to face the problem dealt with in this paper. In order to convince the profession of the value of electro-therapy we must first cure our patients, and we cannot cure them unless we can hold them. I do not see any way of doing this in some cases except by selecting the cases carefully and making in these an advance charge which will cover the expense likely to be incurred. At the outset many patients honestly intend to be regular in their attendance, but they become discouraged over the slow progress of their case, or more often, listen to the advice and gossip of their neighbors and leave off treatment. I do not believe it is unethical or in the slightest degree derogatory to professional honor and ethics to tell the patient at first that the case is a chronic one, and that a cure is not likely to be obtained for a long time, and that you will not accept the treatment of the case unless you are paid in advance for treatment extending over a period long enough to insure benefit to the patient.

Dr. William B. Orear: There are some people who cannot pay in advance a considerable lump sum, but it would be proper to charge for, say, a month's treatment, and if the patient cannot afford this, treat him for a month for nothing. I do not see, however, why the practice of electro-therapy cannot be conducted just as are other departments of medical practice.

Dr. Pilgrim: My idea in bringing up this topic was not because of its financial but its therapeutic aspect. I simply pleaded for an opportunity to treat these cases properly.

THE THERAPEUTIC USE OF ELECTRICAL CURRENTS OF HIGH POTENTIAL AND FREQUENCY.*

BY J. HOLCOMB BURCH, M. D.

Associate Member of the Syracuse Academy of Medicine, Member of the Onondaga County Medical Society, New York State Medical Society, etc.

Perhaps there is no subject that has occupied the thought of the American profession less than that of the application of electrical currents of high potential and frequency in the treatment of disease.

This may be accounted for from the fact that the apparatus now in use for the generation of these currents is both cumbersome and expensive, and also that the bibliography is indeed limited.

High-frequency currents are such forms of electrical energy as are characterized by their immense voltage, and the great frequency of their alternations.

At the present time two classes of apparatus are in use for the production of these currents: the static machine and the various modifications of the induction coil used in X-ray work, the voltage and frequency of alternations of which is still further augmented by means of Leyden jar condensers that connect the secondary windings of the X-ray coil with the primary windings of a Tesla coil or the high-frequency attachment of D'Arsonval and Oudin.

As the static machine is mostly used in this country, I shall consider several of the modalities that may be utilized from this source of electrical energy; which, while currents of great potential, their rate of alternation are, as ordinarily employed, not of sufficient frequency to be classed as high-frequency currents.

Many workers in this field maintain that there is a difference in the physiological effects of the high-frequency currents as generated from these two sources of electrical energy, from the fact that the coil current is a transformed street current, and, therefore, of relatively large amperage that is said to be dangerous when administered in currents of more than 1500 volts. My own experiments have led me to believe that if the static current is likewise transformed by means of a Tesla in-

* Read before the Syracuse Academy of Medicine, May 5, 1903.

ductor, a solenoid, or special electrodes that may be employed for this purpose, that the effects of the two currents, both physiological and therapeutic, are practically the same, notwithstanding the greater amperage of the coil current.

As the ordinary static modalities, such as the disruptive discharge or sparks, the convective, or the spray or brush discharge, and the conductive or the wave current and Franklinic-induced current are familiar to you all, I should consider only such currents as are less commonly used and understood.

Perhaps one of the most useful of the electro-static modalities is the Morton wave-current. There seems to be much confusion in regard to the proper technique of applying this current, it being confounded with the so-called potential alternating modality of Monell. Both are spark-gap currents, the physiological effects of which are without doubt identical. The potential alternation, as Monell employs it, is an interrupted insulation produced by placing the ball and point electrode attached to the portable pedestal in such a position as to draw a series of sparks from the positive prime conductor of the machine. The other side of the machine is grounded, and the discharging rods are widely separated. The patient, having removed his shoes, sits upon the insulated platform, his feet resting upon many thicknesses of paper upon a metal plate that is connected with the ball and point electrode. The patient must become charged by each Hertzian wave that passes in the form of sparks between the ball and point electrode and the prime conductor of the machine. The Morton wave-current differs in that a metal electrode is in contact with the surface of the patient, and that the discharging rods are used rather than the ball and point electrode. The patient is connected to one side of the machine, preferably the positive, while the other side is grounded. This method is by far more practical, as the spark-gap may be regulated at the will of the operator. In utilizing this current for the purpose of making local application to the various parts of the body plates or strips of malleable metal are applied to the affected part and connected by means of flexible cords to the positive side of the machine, the negative being grounded. The spark-gap is regulated according to the requirements of the case, the rule being not to cause muscular contraction. From my clinical results and experimental findings I am convinced that

this modality is identical in its action with the condensation and direct applications of the D'Arsonval current. In its various applications the wave-current is without doubt one of the most useful of the electro-static modalities, and while Dr. Morton deserves the credit of having discovered and first described it; yet, its elaboration and application to practical therapy is due to the efforts of Dr. William Benham Snow, as is also the next most important modality, the discharge produced by means of a wooden electrode.

To successfully employ this modality a static machine having at least eight revolving plates is necessary. It should be run at full speed, the patient sitting upon the insulated platform, and being connected with the negative side of the machine by means of the shepherd's crook, while the positive side is grounded. The second ground chain is attached to the proximal end of the electrode. The electrodes should be made of soft maple or whitewood, and as they soon polarize by becoming carbonized, should be frequently renewed. It will require a current of immense voltage to successfully utilize this modality, as the wood offers great resistance, to which may be due the peculiarity and therapeutic efficacy of the discharge. The discharge itself is a multitude of fine needle-like sparks of a beautiful violet color. While this modality, as above described, is of great potential, it is not, strictly speaking, a high-frequency current, from the fact that there are not sufficient alternations to render it as such. In my own work I have modified this modality, making it practically a high-frequency current. In place of the simple wooden rod I cover the distal end of the soft maple electrode with an ordinary test tube. By so doing I secure both high voltage and frequency, from the fact that the test tube serves the same purpose as the outer coatings of a Leyden jar by acting as a condenser. The current thereby becomes changed to one of great frequency, although still falling far below the frequency of the Tesla or D'Arsonval current. I soon found that the test tubes were very prone to puncture, and thereby become worthless. To obviate this difficulty I tried many methods without success. I finally experimented with liquid glass and shellac. The distal end of the electrode is covered with a coating of liquid glass such as is used in surgical dressings and allowed to dry when a second coating is applied, after

which several coats of very thick shellac are employed. I have found this a very happy substitute for the test tube from the fact that, should the coating puncture, it is but a simple matter to recoat the electrode.

While in New York a short time ago I observed Dr. Snow using vacuum glass electrodes by attaching them directly to the negative side of the static machine by means of flexible cords, the opposite, or positive side being grounded. There was a spark-gap between the discharging rods of from one half to two inches. The current was thus interrupted at this point, while the electrode, being a condenser, interrupted it still further at the point of discharge. This modality still further simulates the D'Arsonval current. I procured several of these electrodes, and while I found them very successful from a therapeutic standpoint, I found them at the same time very perishable from the fact that they soon became punctured and worthless. I began experimenting, hoping that I might find a cheaper substitute. I found that an ordinary test-tube filled with granulated carbon through which ran a small metal rod, attached to a vulcanite handle by means of a metal collar, answered the purpose very well, except that when used in the manner above described irritating sparks would pass from the metal collar to the patient. This led me to experiment with the various disruptive and convective discharges without the use of the insulating platform. I was amazed at the results that I was enabled to obtain by so doing. I simply have the patient sit upon an ordinary chair or stool. The positive side of the machine is grounded, while attached directly to the negative side, the discharging rods being separated according to the effect desired, is attached the electrode by means of a flexible cord. By this means a long, clean percussion spark may be obtained that is by far less painful to the patient than when sitting upon the insulated platform. The spray thus produced surpasses anything that I have ever been enabled to obtain by means of insulation. In fact, except for the applications of the wave-current and the static breeze I have abandoned the cumbersome platform. Therapeutically I have accomplished results that I never obtained by the method of insulation. These experiments taught me that the various electro-static modalities could be used without the platform, and that the various high-frequency elec-

trodes could be utilized, producing a voltage and frequency not obtainable by insulation, from the fact that the whole force of the electro-static charge is in this manner directed to the point of application. To demonstrate the potency of this current I placed between two thick plates of glass a strip of blotting paper saturated with potassium iodide. Allowing a stream of fine needle sparks that issued from the extremity of the

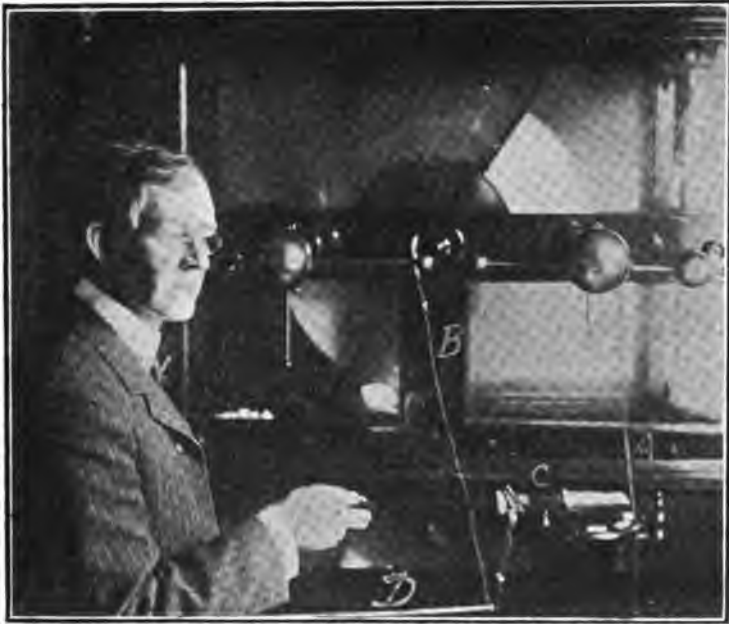


Fig. 1.

electrode to fall upon the surface of the glass, free iodine was liberated at the expiration of a few seconds, coloring the blotting paper. This experiment demonstrated, I think, that currents of high potential and frequency have the power to penetrate the skin. This question has caused much discussion among physicists, Tesla having maintained that these currents have not the power to penetrate the human integument, but that the surface of the body simply becomes charged. While this statement was disproven by D'Arsonval, it has greatly retarded the progress that should have been made in this field of research.

The modalities that we have considered, while they closely approach the high-frequency currents of D'Arsonval and Oudin, still fall short of the frequency of alternations to render them strictly as such. Therapeutically, I am convinced that the effects are practically the same.

In the production of purely high-frequency currents two well-known principles of electro-physics may be employed: induction and resonance. Tesla utilized the principle of induction. He constructed a coil consisting of a primary winding of coarse wire, not wound upon a soft iron core. This primary winding is very carefully insulated by means of a hard rubber tube and paraffined paper. Around this primary winding thus insulated there are wound many turns of very fine insulated wire, the insulation of which is still further guarded by means of a strip of paraffined paper between each winding. The completed coil is immersed in oil to prevent its breaking down. In utilizing this coil the secondary windings of an ordinary X-ray coil are attached to the inner coatings of two Leyden jars, to the outer coatings of which are attached the primary windings of the Tesla coil whose secondary terminals become, when the coils are excited, sources of currents of immense frequency and voltage, and but little amperage. An installation of this kind is very expensive, and requires the greatest care and attention. It is not practical when used in connection with an X-ray coil. With a static machine a coil of this variety may be made practical from the fact that its construction may be greatly simplified. All that is required is one primary winding of very coarse insulated wire without a core. This winding is separated from the secondary by a hard rubber tube, or, as I have used in my experiments, a tube made of several layers of paraffined paper. The secondary winding need consist of but one winding of insulated wire about half the size of the primary. In using this simple coil the primary winding is attached to the outer coatings of two Leyden jars, the parts being connected with the static machine in the same manner as when the static-induced current is employed. From the secondary winding of this coil currents of extreme high-frequency may be obtained. This is the form of high frequency apparatus made use of in this country in connection with the static machine, and while it will generate currents of high frequency, it is vastly in-

ferior to the currents produced by the solenoid of D'Arsonval or the resonator of Oudin.

D'Arsonval, unlike Tesla, utilized the principal of resonance rather than induction. He employed a solenoid that

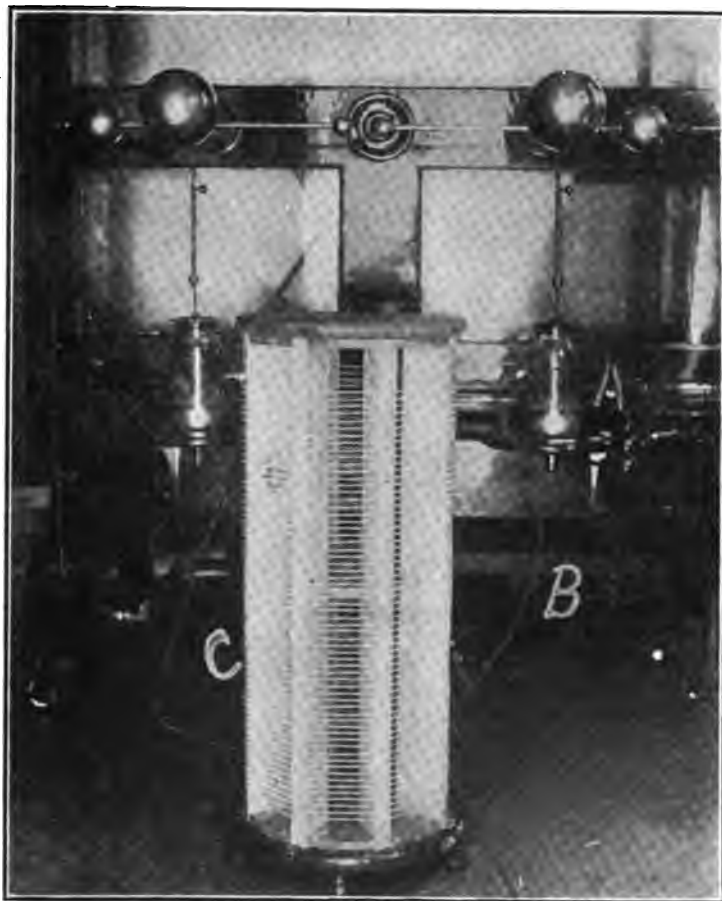


Fig. 2.

consisted of a spiral containing from fifteen to twenty turns of very coarse bare copper wire. Each turn of this solenoid is separated from its fellow by an interval of from eight millimeters to one centimeter. The two extremities of this solenoid are connected with the outer coatings of two Leyden jars, the inner coatings of which are connected with the source of discharge of a generator of high-potential electric energy as the X-ray coil or static machine. Each discharge that takes place within these Leyden jar condensers gives birth to a Hertzian wave within the solenoid, thereby producing currents of extremely high voltage and frequency. D'Ar-

sonval determined that currents could thus be produced having one thousand million vibrations per second.

As the local applications from the small solenoid of D'Arsonval are somewhat painful, Oudin constructed a resonator that consists of forty-five meters of copper wire having a diameter of from 2—5 mm. There are fifty turns of this wire that may be wound upon a wooden cylinder well paraffined; or, it may be square. Each turn of this wire is separated from its neighbor by an interval of 8 mm. One extremity of the resonator is attached to one of the extremities of the small solenoid of D'Arsonval, while the other ends in a free extremity. There is a sliding rod within the resonator that is held in contact with the turns of wire by means of a spring, by which arrangement as many windings of the resonator may be utilized as may be required. If two persons grasp with one hand the extremities of the small solenoid, and with the other the opposite sides of an incandescent light bulb, the lamp will brilliantly glow from the mere contact. A so-called high-frequency current that will not produce this phenomenon cannot be classified as such. In fact the lamp should glow by contact with but one person, the other merely holding the extremity of the solenoid.

The adaptation of the solenoid to the static machine caused me a great deal of trouble, many feet of copper wire of various diameters, and no small amount of perplexity. The D'Arsonval and Oudin apparatus were constructed with reference to the greater amperage of the coil-current, and I found that they were not adapted to the static-current. After experimenting with a great many solenoids of various sizes and lengths and diameters of wire, I at last made an instrument that gave me entire satisfaction. It consisted of sixty-three turns of No. 14 copper wire either bare or insulated, each turn being separated from its fellow by an interval of 8 mm. The circumference of each spiral is one meter. The supporting frame may be made of wood well paraffined, the shape of which may be either cylindrical or triangular. This arrangement combines both solenoid and resonator. The Leyden jars are attached to the machine in the same manner as when the static-induced current is used. To the binding posts connected with the outer coatings of the jars are attached the terminals leading to the solenoid. One of these terminals is connected directly with a terminal of the solenoid, while the other is connected with one of its spirals, utilizing as many turns as may be necessary to produce the resonance required. The other end of the solenoid is a free extremity attached to a binding-post to which may be connected various electrodes for local applications. It will, therefore, be seen that with the one apparatus we secure the effects of the D'Arsonval solenoid and the Oudin resonator.

(To be concluded.)

SOME THERAPEUTIC NOTES ON THE X-RAY.

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The aim of this paper is to obtain a consensus of opinion on the whole question of the action, scope, and status of the X-ray as a curative agent. This unpretentious contribution to the subject will be of value to the extent of its ability to elicit discussion.

Mode of Action of the X-Ray—A sentence in the admirable little brochure of Finsen on "Phototherapy" may throw some light upon this vexed question. He says: "We know that the chemical rays bring to the body which absorbs them a certain energy, transformed in different ways, and we come to see that the most special transformation of this energy from the biological point of view seems to be an excitation of the nervous system, which doubtless influences secondarily all the vital functions." May not the action of the X-ray be somewhat similar?

I incline to the theory that the disturbance set up within an energized Crookes tube occasions an etheric bombardment outside it, due to induction, and accompanied by the well-known concomitants of induction, and with waves of such rapid vibration and intensity that tissues irresponsive to the surgings of other waves are readily penetrated and correspondingly influenced by these. And that on the stable normal tissue cells this excitation, when not carried to excess, acts as a stimulus, and as such cells are under the control of the trophic nerves, a natural reaction will follow, while the less stable, abnormal cells, having escaped such control, and hence not being amenable to repair, will succumb under the excitation, for on them it will act as an irritant. If the excitation is pushed too far, the normal cells overstimulated thereby will also break down. Yet this theory leaves much unexplained.

Choice of Apparatus.—I am in favor of the static machine as the means of energizing the X-ray tube. A static machine with which I have done some good work is an old-type, 26-inch, 6-plate machine, which has seen eight years' active service in other therapeutic fields.

The conducting cords should be well insulated ; many of those offered for sale leave much to be desired.

The tube with a fairly high vacuum is the safest and least liable to burn the tissues. A complicated tube is not a necessity. Wrapping the shank of the tube with rubber sheeting or packing has seemed to me to lessen the chances for sparking and puncture in that vicinity, especially when in close proximity to metal.

All tube-holders and stands which I have seen could be improved upon without much effort. Flexibility with stability is desirable.

Technique.—As a general rule, I prefer to err upon the side of safety. During the first and second weeks of treatment I frequently start with the tube at least one foot, and sometimes two feet, from the part to be rayed, and watch the part carefully, raying every second day. Should no marked reaction occur in this time I gradually lessen the distance. Six inches from the anti-cathode I rarely overstep, unless occasionally in a resistant case of lupus for instance, where I sometimes allow the tube to touch the part. Only in critical cases do I approve of daily raying, and twenty minutes is my limit of exposure. At first I prefer to treat for ten minutes only.

Where a large surface, such as the abdomen, is to be acted upon, I ray different portions at succeeding treatments, until the part is "tanned," when more attention can be paid to particular locations. In dealing with obstinate cases, I change the position of the tube, so that the rays do not always strike the part at the same angle. I sedulously avoid the production of more than a moderate erythema.

When it is necessary to shield parts upon which it is not desired to act, I employ the Crookes composition of lead and tin, which can readily be shaped by scissors. When the tube is in close proximity to a metal shield I interpose rubber sheeting, for the double purpose of protecting the patient from induction sparks and the tube from puncture. When raying portions of the face, I usually cut a small shield to suit the particular case, fastening it on with narrow strips of adhesive plaster, while a larger shield, with suitable aperture held over the former by means of a bandage, protects those parts not shielded by the smaller. In a tongue case, I coated a child's mask with heavy tin foil, first cutting out the chin. The lower jaw, upper and

lower lips, were protected by sheet lead, and a short lead funnel used with this mask restricted the rays to the part affected.

In a rectum case I used a thick sheet of rubber over the buttocks and thighs, with an aperture to correspond with the opening between the blades of a rectal speculum.

If apertures in shields are cut in a stellate form, all the cuts radiating from a common center, the size of the aperture may readily be varied by the extent to which the points thus formed are turned in.

In raying, bony prominences should be avoided as far as practicable. It is well to protect cicatricial tissue also when practicable, as such tissue breaks down very readily under the influence of the ray.

Adjuvants to Treatment.—In the British Medical Journal for June 21, 1902, there was a note by Dr. W. Allan Jameison on the "Employment of Adrenalin as an Adjunct to the Light Treatment of Lupus," in order to render the part more anæmic, and therefore less resistant to the ray, for fluids decrease penetrability. Acting on this suggestion, I have applied the 1-1000 solution of adrenalin chloride in lupus vulgaris before raying, and have found increased reaction to result. Patients are also directed to apply the 1-10,000 solution to the edges of the patch, night and morning. This has also appeared to be beneficial.

The static breeze, with the soft maple ball and point electrodes, are excellent adjuvants to raying, especially over ulcerated surfaces and their edges following each raying and in intervals when the parts are too sensitive for the ray on account of excessive reaction.

Indications for Use.—To relieve pain, to lessen œdema, to promote absorption, to act as a parasiticide, to act as a bactericide, to cause the destruction of malignant growths, to limit the extension of malignant growths, to prevent the recurrence of malignant growths; these are but some of the indications for the employment of this agent.

Field of Usefulness.—A wide range of skin diseases, where raying is simply invaluable as a curative agent are rarely seen by me, my practice being restricted to electro-therapeutic work, the greater part of which is referred to me by my confrères, hence I shall pass over many of these, and shall very briefly present some conditions in which the ray has seemed to be of advantage.

A case of *nævus vasculosis* in a child is gradually fading under treatment; several pigmentary *nævi* have disappeared. A case of *lupus vulgaris* of more than ten years' standing, which has resisted all treatment hitherto resorted to by many confrères, has been under my care since February of this year. The greater portion of the nose was involved, and the left nostril almost entirely occluded. The nose was covered with thick crusts, under which suppuration freely occurred, and which, when detached, left a spongy surface, bleeding upon the slightest provocation. After a few treatments, the nostril returned to its normal lumen, the crusts very soon became thinner and thinner as new ones formed, with the exception of a few small points which are disappearing, and the surface of the nose is now covered with apparently healthy epidermis, which is rapidly regaining its normal color. In this case the tube has latterly been allowed on many occasions to rest against the nose. The 1-1000 adrenalin chloride solution applied before raying was of material assistance, and reaction was much more marked under its use, so that treatment had to be suspended for several days after its first employment. Other smaller cases of *lupus* disappeared completely after six or seven treatments.

A case of localized *scleroderma*, at the level of the seventh cervical and intestinal glands, was also much reduced in dimension May 27, and treated thrice a week since then to August 7 is now free from pain, and very little thickening is perceptible; but I have directed the patient to be rayed once a week for a short time as a precautionary measure.

In a case of *carcinoma* of the liver, in which that organ was enormously enlarged, the ray was used as a forlorn hope, and although the patient survived for less than a month after his first consultation, yet the fact that the ray had some effect upon the liver was shown by the black tarry stools passed after the third treatment.

The value of the ray was also very clearly demonstrated in another hopeless case, viz., *lymphadenoma*, in which the inguinal glands on either side were enlarged to the size of goose eggs, causing a very distressing *œdema* of the lower limbs. The cervical glands and the intestinal glands, as well as the spleen, were much enlarged. The inguinal glands rapidly receded after the third raying, the spleen returned to its normal size, the cervical and intestinal glands were much reduced in dimen-

sions, and none of these organs enlarged. But the disease was too deeply seated before treatment was instituted, and some of the deeper intestinal and retro-esophageal glands did not respond to the ray, and, after giving most helpful evidences of repair, the patient gradually became weaker, especially during the warm weather of the summer, and eventually passed away.

A case of carcinoma of the stomach is still under observation.

A fibro-sarcoma in the left pectoral and supra-clavicular region is gradually yielding.

A carcinoma of the rectum, still undergoing treatment since July, has been able to discontinue cocaine suppositories for a couple of weeks, and instead of ribbon-shaped stools has passed many well-formed ones, and is much improved in general condition. The treatment in this case has hitherto been chiefly external to buttocks and abdomen. The speculum has been used upon two occasions.

A sarcoma of the right breast in a man, recurrent after two excisions, treated thrice a week, but with several omissions, since June, is practically cured. The cicatricial tissue broke down. Three weeks after the first treatment he noticed a gluey discharge from the old scar, and two weeks later his physician considered the growth reduced one-half. As soon as the colloid degeneration began to manifest itself, the static brush discharge from the wooden ball electrode was used locally.

Tubercular Ankle Joint.—A case in which this diagnosis was made by a confrère left the hospital free from pain, swelling, and lameness after twenty-one rayings.

Sub-acute articular rheumatism of ankle joints in a hospital attendant, obliged to be almost continually on her feet; swelling and pain abated after the third raying and have not returned, and the improvement continues.

Persistent callous sinuses of abdominal wall, post-operative.—A couple of cases are mentioned in the *British Medical Journal*, May 31, 1902, which healed rapidly after a few exposures to the ray.

Goiter.—I am trying the effect of the ray in a number of cases of fibrous goiter, but none have been sufficiently long under observation to warrant a report.

Neurasthenia.—In this troublesome condition two very annoying and often persistent symptoms are enteroptosis and insomnia. In one aggravated case the first raying of the abdomen

gave immediate relief to the intestinal distress, secured undisturbed sleep, and initiated convalescence which was complete in a couple of months.

Limitations to the Employment of the Ray.—This feature I shall leave for those of more experience to speak upon. In epithelioma of the tongue—especially in post-operative cases—alone of all malignant conditions have I noticed an ill effect from the ray in the matter of excessive breaking down of tissue and non-retardment of growth.

Sequelæ and Their Treatment.—We should never lose sight of the fact that rapid degeneration of morbid growths takes place under raying, plainly manifested in the systemic effects induced, such as rise of temperature, malaise, diarrhea. It is well to caution patients as to what they may expect lest they be unduly alarmed. Precautions should be taken to guard against septic absorption, especially in the case of internal growths, and provision should be made for the due removal of broken down material.

In the Philadelphia Medical Jour. for August 9, 1902, appears "A Case of X-Ray Dermatositis," by Dr. Linnæus Prince, due to prolonged and frequent use of the fluoroscope in diagnosis.

In the British Medical Jour. recently appeared an editorial on "Untoward Effects of the Roentgen Rays," stating that at a meeting of the Imperial Medical Society of Vienna May 23, 1902, three cases were cited of telangiectasis after long exposures for hypertrichosis. The dilated vessels only appeared several months after treatment. Obstinate ulceration and pigmentation were also charged against the ray. It had been used by a layman for half an hour three times at intervals of three or four days. Laymen should never be permitted to employ the X-ray.

Ray erythema I combat with resinol ointment. If the skin breaks down, which except in cases of cicatricial tissue I have fortunately rarely met with, the part is treated with the brush discharge from the wooden ball electrode.

I feel that an apology is due for the presentation of such bare notes, but my fragmentary paper is given from a desire for a consensus of opinion on the points presented.

(1) What is the mode of therapeutic action of the X-ray?

(2) What apparatus is it most desirable to employ?

(3) What constitutes the best shield to protect parts on which the action of the ray is not desired?

- (4) What is the correct technique to be observed?
- (5) What adjuncts to treatment may be employed with advantage?
- (6) What are the indications for the use of the X-ray in therapy?
- (7) In what diseases may the chief field of usefulness of the ray be found?
- (8) What sequelæ may occur, even with due care; how may such best be prevented or treated if present?

DISCUSSION.

Dr. G. Betton Massey said regarding the case of neurasthenia in which such a good result had been obtained, that he would like to know whether there was noted in this patient an excessive pulsation of the abdominal aorta. This was a very common sign in such cases, and yet it was hardly mentioned in the literature. That this was not due either to an individual peculiarity or to thinness and laxity of the abdominal walls, was shown by the reduction of this pulsation often after only one abdomino-dorsal galvanic treatment.

Dr. J. D. Gibson said that he had enjoyed this paper very much, and was delighted to see that Dr. Dickson juggled with the X-ray as much as he did himself. He had cured lupus with nothing else but the brush discharge, although he believed with the X-ray the cure could be decidedly hastened. The case of carcinoma of the liver reported in the paper was certainly most interesting, and opened up a new field to the X-ray operator. He believed that in the near future it would be possible to permanently and surely cure cancer of the liver. The great problem at the present time was to secure drainage, and it was not improbable that this would be secured by cutting down upon the part. Last year he had a case of carcinoma of the liver of enormous size, and he had since deeply regretted that the X-ray had not been used in that case. It had not been so used because so little was known about the subject at that time. The more a case of cancer had been surgically interfered with, the more obstinate would it prove under X-ray treatment.

Dr. A. D. Rockwell said that the question arose with regard to the reason pain was relieved by the galvanic current or by the X-ray. Peripheral pain indicated pressure on the nerve endings, either organically or functionally. This explained the relief of pain by the application of the high tension and of the galvanic currents, these measures setting up a sort of circulatory drainage and thus relieving the pressure upon the neurons. The relief of pain afforded by the galvanic current should not be forgotten. Some time ago he had had a case of severe uterine carcinoma, and he had made use of a clay electrode with a current of 150 ma. day after day with the

result, as certified to by Drs. Bryant and Janeway, of completely relieving her distressing pain. This happy result was brought about by the relief of the pressure on the nerve endings by means of circulatory drainage. It was probable that the X-ray acted in a similar way, although in addition it improved the nutrition of the nerve endings. A good deal had been said about the brush discharge. He had used this discharge for years, but was of the opinion that too much was made of it. He considered the discharge obtained by the use of the converter from the static machine and a step-up process, giving greatly increased voltage, far superior to the brush discharge. This hyperstatic current, as it was called, was very little used, but he had employed it quite extensively in the past few months in a variety of cases. In a case of *xanthoma palpebrarum*, a condition considered to be incurable except by the knife, he had persistently employed the brush discharge with no result, and the patient had passed from under his care. She had, however, subsequently returned to him and had received treatment with the hyperstatic discharge, with the result that the yellowish stain rapidly became white, and she recovered. In *acne* he had also seen excellent results from the use of this current, and he believed that by the use of this current of immense tension a great deal could be done in this disease.

Dr. W. B. Snow said that No. 32 gauge metal resembling tin composition was an excellent substance to employ for X-ray shields. It could be obtained at 86 Grand Street, New York City, from the John J. Crooke Co.

He had used the brush discharge a good deal, and with much more satisfaction than had Dr. Rockwell. The wooden electrode had always succeeded well in his hands, in the treatment of *eczema* and in other inflammatory conditions, such, for example, as a sprain of the hand or ankle, or a rheumatic joint. It might be necessary to make the application for fifteen minutes or more, but the relief was far more satisfactory than by other means. He suggested that those who did not succeed could not employ the same technique. Perhaps the difficulty was in not properly grounding the current, or employing a machine of sufficient capacity, or the electrodes might be defective.

Dr. Willis P. Spring said that he had been experimenting with shields recently with the special object of protecting the tube and preventing short circuiting. His attention had been called to the soft rubber used by dentists in making artificial teeth. It was found to be quite opaque to the X-ray, and could be secured in sheets at three dollars per pound.

Dr. W. W. Eaton of Massachusetts said he had been using the hyperstatic current for a year or more. He had seen some of the most severe facial neuralgias relieved after an application of ten minutes, and often not return after the first or

second treatment. In the treatment of some of the skin diseases, and particularly chronic eczema, it was especially useful. One case so treated was an eczema of the arm of two years' standing, which had resisted all the usual methods of treatment. This electrical treatment was employed on three occasions, and the eczema was completely cured and had not returned up to the present time, a period of about six months. In another similar case the result was equally good except that about twelve treatments were required. In cases of carcinoma and sarcoma it seemed to him advisable to make use of the galvanic current as well as of the X-ray. Cases of carcinoma of the liver would seem to be especially suitable for this. In one such case treated by a galvanic current of 150 ma. and clay electrodes front and back, the result had been good, although the patient could not be said to be completely cured. Each séance lasted about fifteen minutes, and was repeated every second or third day.

Dr. Pratt said that this brought up something of great interest. Dr. Alexander Wiener, a surgeon of Chicago, had designed a celluloid cream as a base, which is mixed with ten per cent. of creosote. With this applied over a tubercular gland the creosote was driven into the tissues by the ray.

Dr. C. E. Skinner said with reference to Dr. Pratt's idea that X-ray burns are the result of driving microbes into the skin, that it was pretty well conceded that microbes could not be driven through absorbent cotton. He had made use of this mode of protection in a case which had been operated upon, using the surgical dressing in this way, yet in spite of this the patient was quite badly burned. He also knew of a case in which a man exposed himself to a medium vacuum tube at a distance of five inches, and sustained a very severe burn, which was absolutely obstinate to all treatment, and eventually had to be excised to a depth of an inch and a half in order to save his life.

Dr. Nunn said if it were true that a microbe could be driven in with the X-ray, then it must be equally true that medications can be driven in in the same way.

Dr. Dickson, in closing the discussion, said that in his case of neurasthenia there was no excessive pulsation of the abdominal aorta, but there was irregular contraction of the muscular coats of the intestine. This had been quieted by the treatment. As to the treatment of internal cancer, he would say that ninety-nine out of one hundred of his cases were sent to him by the surgeons, who had already done all the surgery that was necessary. In this way he was working in conjunction with the surgeons, and if they considered drainage necessary they would establish it. The case of neurasthenia had been treated by the other accepted methods, but without good result until the X-ray was employed.

THE EFFECT OF ROENTGEN RAYS UPON CERTAIN BACTERIA.

BY WILLIAM HILL BEAN, PH. B., NEW HAVEN, CONN.

It being generally conceded that the rays are not bactericidal, the following experiments were carried out to see if any effect from the exposures could be observed: The culture medium used throughout the series was bouillon, and the basis of each experiment was a twelve-hour culture. Immediately before exposure to the rays a second and third tube were inoculated from this culture, one of which was exposed along with it, the other being kept as a control. After the exposure a fourth tube was inoculated from the culture, and incubated with the second and third tubes at 37° C., for twelve hours.

No. I a.

Bacteria.—*Bacillus coli communis*, *bacillus typhosus*, *Klebs-Loeffler bacillus*, and *staphylococcus pyogenes aureus*.

Exposure.—Fifteen minutes at a distance of ten inches from the anode of an Edison tube, which forced back a spark gap of four inches, excited by a Kinraide coil.

Examination.—After incubation showed no difference as to growth, motility (when present), or staining qualities in any of the three tubes of each set.

No. I b.

Same as No. I a except that the exposure was to rays from a Truax & Greene tube, which forced back a spark gap of three inches, excited by a Van Houten & Ten Broeck, twelve-plate static machine.

Examination.—After incubation gave no evidence of any effect whatsoever.

No. II a.

Bacteria.—*Bacillus coli communis*, *bacillus typhosus*, *Klebs-Loeffler bacillus*, and *staphylococcus pyogenes aureus*.

Exposure.—Thirty minutes at a distance of ten inches from

the anode of a Swett & Lewis tube, which forced back a spark gap of four inches, excited by a Kinraide coil.

Examination.—After incubation showed no evidence of any effect.

No. II b.

Same as No. II a, except that the exposure was to rays from a Wagner-Gorman tube, which forced back a spark gap of 2 1-2 inches, excited by a Van Houten & Ten Broeck twelve-plate static machine.

Examination.—After incubation showed no evidence of any effect.

No. III.

Bacteria.—*Bacillus coli communis*, *bacillus typhosus*, *staphylococcus pyogenes aureus*, *streptococcus pyogenes*, and *Klebs-Loeffler bacillus*.

Exposure.—One hour at a distance of ten inches from the anode of a Swett & Lewis tube, which forced back a spark gap of four inches, excited by a Kinraide coil.

Examination.—After incubation indicated that no effect had been produced.

Conclusions.—The Roentgen ray has no effect whatsoever upon *bacillus coli communis*, *bacillus typhosus*, *staphylococcus pyogenes aureus*, *Klebs-Loeffler bacillus*, or *streptococcus pyogenes*, during exposure of one hour or less, no matter what make of tube is used or what the method of excitement is.

THE next annual meeting of the American Electro-Therapeutic Association will be held at Atlantic City, N. J., on Tuesday, Wednesday, and Thursday, September, 22, 23, and 24, 1903.

Editorial.

WHY REST THE NEURASTHENIC?

Neurasthenia is a condition characterized by the presence of a mind diseased—the inhabitant of a body functionally deranged. A condition which arises from disturbance either of the mental or physical equilibrium of both—generally both.

The indications, therefore, are two-fold—to relieve all contributing conditions and restore the normal equilibrium.

It is rare to find cases where some affection cannot be found which has arisen either from habit, accident, or environment which if not corrected acts to make the condition a permanent one. Dysmenorrhea, prostatitis, constipation, impaired digestion, inactive metabolism, or one or more associated, are either the cause or effect of neurasthenia.

Exaggerated reflex manifestations, hysteria, headache, and insomnia and so-called nervousness are symptoms which occupy most of these patients' attention. Why should this functional neurosis be treated by rest—as well treat a sprained joint by such a procedure. What the system functionally deranged requires most is exercise to induce the activity of normal function, and the removal of every congestion, association and habit which contributes to the derangement.

To rely upon rest and passive treatment to cure neurasthenia in the large majority of cases is to trifle with fate, denying facts, thereby impoverishing the physical conditions of the patient.

Judicious treatment requires (1) the relief of any congestive process which may be present; (2) the induction of an increased degree of activity directed to all the organs of elimination, (3) a careful regulation of diet and environment; and (4) the employment of such psychic influences as will elevate and encourage the mentality to a state of hope and restfulness and thereby incidentally increase the efficiency of the other means employed.

For the relief of congested or inflammatory conditions, the local applications of electricity, hydrotherapy, heat and vibration are adequate and efficient. For the induction of functional activity, exercise and the judicious employment of the impaired organs is imperative. Rest favors decay, atrophy and func-

tional debility while regulated exercise and use increase the general and local metabolism inducing finally a normal condition. The diet and environment of the patient are of first consideration. The diet should be nourishing and conformed to the requirements of nutrition and the systematic exercise which should be instituted as a part of the rational treatment of neuresthenia. The choice of environment for a neuresthenic is a subject upon which a wrong impression exists in many cases. The patient, who depends upon his occupation for a livelihood and to whom a removal from his business will strain his finances to a degree which will cause him anxiety, will not be benefited by leaving home. If the trouble has been occasioned by overwork it is far better to regulate his habits and shorten his hours of labor, causing him to take exercise and recreation at home, than to send him away for treatment. On the other hand, if the patient's circumstances and environment are such that he may leave his home and business without worry, and perhaps to advantage, and he can be placed under influences that are cheerful and at the same time have judicious treatment it will then be the proper course to pursue. The physician who succeeds in the treatment of his neurasthenic patients is the one who commands their respect and confidence and at the same time is able to influence their mental status in such a manner as to maintain a hopeful, healthful state of mind which will add greatly to their physical improvement and eventually create a state of mind and body progressing to the ultimate condition *mens sana in corpore sano*.

* * *

THE USE OF PHYSICAL METHODS IN PUBLIC AND PRIVATE HOSPITALS.

Since the introduction of the X-ray for diagnostic purposes, apparatus have been placed in many hospitals for skiagraphic purposes. In numerous instances, the coils and static machines so installed have been directed during the last two years to the treatment of malignant disease. In a few of the large hospitals dry hot air apparatus will also be found. These will embrace most of the apparatus employed for the administration of the so-called physical measures in such institutions.

In the light of progress, and the present well-demonstrated

value of these measures in therapeutics, and the advantage arising from their use in institutional work, it is deplorable that so little attention is accorded them. The consulting staff of these institutions is composed in most cases of physicians and surgeons who have not been trained to use the methods, and consequently stand between their employment and the public who come for treatment.

When it is appreciated that the consulting staff of such institutions are unwilling to have any measure used with which they are not themselves familiar and will not devote the time necessary to acquire such information it will be easily understood why physical measures are neglected and why they will be for some time to come.

The use of static electricity, the X-ray in radiotherapy, the employment of dry hot air, light, mechanical vibration, and hydrotherapy have already been established as invaluable in the treatment of many conditions; and yet the great hospitals of the country are disposed to neglect them. The acknowledgment of their value is universally accepted, and yet on account of professional prejudice they are not given their proper place in public institutions. To continue indefinitely this state of affairs, is to prejudice the mind of the intelligent community against the honesty of the profession, and the best interest of the institutions with which they are allied. There is a remedy for this state of affairs and a simple one. If those who have the health of the community in their hands are unwilling to institute the methods because they will not employ them themselves, they should permit these therapeutic measures to be installed, and prescribe them to be operated under the intelligent eye of therapists who are familiar with their application. The young men,—internes in these institutions, will under their advisement operate them successfully. In this way, the busy physicians who have not time to devote to the study of these forms of application will be able to learn more of their value, the young men will have an opportunity to become familiar with their uses, and the next generation of physicians will add to their professional qualification the knowledge and indications for the employment of rational therapeutic measures.

Progress in Physical Therapeutics.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

The Penetrating Power of High-Frequency Currents.

The April, 1903, number of *ADVANCED THERAPEUTICS* published a short sketch of a few experiments by the writer, in which iodide solution was decomposed, and the iodine driven through glass, giving a decided iodine reaction to starch on the under surface of the glass. After the discovery was made, that the high-frequency high potential current not only possessed chemical, but also phoritic and electrolytic properties. Iodide solutions and other remedies were used in the treatment of sore joints, and other conditions in which a medicine might be judiciously used for its local effect. In using a glass metal-lined electrode it was soon discovered that the metal inside the electrode was stained with the free iodine, showing that the phoritic action had taken place in both directions, into the tissues and into the electrode. A clear white bottle, three inches long and three-fourths inch in diameter, was then made into an electrode, by passing through the center of a tightly fitting cork a brass wire, which is connected with the contact piece of a wooden handle. The bottle is filled with a solution of starch. This electrode is used when the iodide solution is to be driven into the tissues. I expected to see the iodide solution gradually turn blue, but, contrary to my expectation, such is not the case. After using this electrode freely for a week or ten days very small particles of blue could be seen floating about in the starch solution, showing that, as each tiny particle of iodine was driven through the walls of the glass bottle, it immediately associated itself with its equivalent of starch, and now may be seen many specks of iodide of starch floating in the starch solution in the bottle electrodes.

F. B. B.

Some Physiologic and Physical Facts Concerning High-Potential, High-Frequency Currents.

Acute and chronic inflammations, especially of the mucous and submucous variety, are all beneficially influenced by the

high potential and high-frequency currents. The current when applied to the skin for a while renders the part dry and red, it seems to possess the property of extracting the moisture from the skin. Often an application may, in very sensitive skins, produce an intense itching that may last for several days. Acting upon this known fact and the experiments with the iodine solutions, a very acute case of inflammation of the prostate was treated solely by the high-frequency high potential current, with a vacuum tube rectal electrode lubricated with a saturated solution of iodide of potash in glycerin. The applications were made per rectum for ten minutes every other day. In about ten days the patient, who had been a great sufferer, and had the appearance of being a very sick man, was much better; the purulent discharge ceased, and the prostatic enlargement subsided, and now, one month later, the man seems again well and strong—has returned to his daily avocation.

The use of the iodide solution with the H. F. H. P. current will be found of great utility in the treatment of the joints of the fingers and wrist in rheumatoid arthritis when the joints are painful.

In speaking of the high potential high-frequency current, I meant a current passing through a high potential coil, alternated by the high-frequency of the Leyden jar discharge, either with a static machine or a coil as the exciter, and not the high-frequency direct static discharges.

DISEASES OF THE ALIMENTARY CANAL.

EDITED BY WALTER H. WHITE, M. D.

Electrolysis in Stenosis of the Esophagus.

J. B. Feldoritch recommends electrolysis in the treatment of cicatricial esophageal strictures. Without claiming decidedly radical curative powers for the method, it may be safely relied upon to effect rapid and comparatively painless dilation. In three or four sittings, each lasting two or three minutes, the author succeeded in stretching a stricture with a diameter of 3.1-3 mm. to 13 mm., a feat which it would require months to achieve by means of the ordinary dilating measures. Recurrences are apt to take place even after electrolysis, but they come considerably later, and valuable time is thus gained. From a palliative point of view, no other method can compete with electrolysis. The technic is extremely simple, and consists in attaching an esophageal sound to the constant current. A galvanometer is indispensable. With weak currents and short sittings, no harm will result to adjacent organs.—*Russka Vrach*, January 4, 1903.

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

Ueber das Zusammentreffen von Oxalurie und Indikanurie.
W. von Moraezewski, Centralblatt für Innere Medicine,
Leipzig.

Examinations were made by the author in Carlsbad in 439 cases, and he found in over 84 per cent. the coincidence of oxaluria and indicanuria and in 23 cases the indicanuria was very pronounced. In only 15 per cent. he found oxaluria without indicanuria and in 10 per cent. oxaluria was absent. Meat diet causes an acid reaction of the urine. The treatment consisted in flushing out the kidneys by copious drinking and internally the taking of magnesia.

Hemorrhages in Suprarenals über Nebennieren Blutungen.
M. Simmonds, Archiv. f. Pathol. Anat. Virchow, Berlin.

Ecchymoses in the suprarenals have been found in infectious diseases, and therefore have been classified as a toxic infiltration. In most cases it appeared in patients with a hemorrhagic diathesis, after thrombosis or embolism. The author has seen twelve cases with a fatal result. The prognosis is more favorable when the hemorrhage is unilateral.

Cryoscopy. D. S. Grim, Phil. Med. Journ. March 21.

The urine is collected direct from each ureter by ureteral catheterization, in order to determine which kidney is affected, which may be combined by the test of methylene blue. Several examinations on different days are needed in order to make a sure diagnosis. Cryoscopy may be called a new method in the examination, particularly to aid the diagnosis of uremia. Dr. Huddleston, New York, read an exhaustive paper on this subject at a meeting of the North Western Medical and Surgical Society in New York.

An Inquiry into the Value of the Irrigation Method as a Means of Aborting and Treating Acute Specific Urethritis.
Orville Horwitz, Phila. Co. Med. Soc., Feb. 28.

This author does not believe in the cure by irrigation and thinks it may lead to complications. We have in this department mentioned the experience of other writers, who report cures—all depends on the execution of the irrigation. Contamination is possible, but if the irrigation is carried on by a steady stream of a syphon arrangement, with a steady outflow through a double canula the infection ought to be removed and a cure follows. The irrigating tube must not be inserted into the urethra to the deeper parts, which will avoid the infection to such regions.

Spinal Anæsthesia with Tropa-Cocain in Genito-Urinary Surgery. M. Krotorzyner, California State Journal of Medicine, San Francisco, February.

The success of this method is based on the use in 120 cases of hospital practice. The author does not use it in private houses, as he fears sepsis to the spinal canal. In his cases he never has had an unpleasant symptom, and considers this form of anæsthesia not more dangerous than any other method.

A case of Banti's Disease, with Diffuse Productive-Nephritis.

Dr. Cyrus W. Field, Amer. Journal of the Medical Sciences; Philad., March, 1903.

This article is interesting to the general practitioner, the case must be placed as one of Banti's disease of several appearances, we find here pronounced anæmia, enlargement of the spleen, a sluggish liver which may be diagnosticated as cirrhosis, a nephritis, and a new chronic enlargement of the spleen. Cases like this must necessarily be accompanied by more or less symptoms of dyspepsia. A sure diagnosis would be elicited by a microscopical examination of the spleen.

Necessity for a more Frequent Use of the Cystoscope in the Diagnosis of Diseases of the Urinary System. By John G. Pardoe. The Lancet, London, March 28.

It is necessary to be an expert in handling the Cystoscope, and, if correctly used, in most cases, the diagnosis is made correctly, when symptoms will not give the cause of the disease. In some instances, the catheterism of the ureters with the latest instruments, and a separate analysis of the urine from each side is a necessity.

Die diagnostische Bedeutung des Ureteren Katheterismus. Importance of ureter catheterism. C. Adrain, Centralblatt f. d. Grenzgebiete, Jena, v. 23.

Das Nieren Aneurysm. Aneurism of the kidney. P. Zeigler. Centralblatt f. d. Grenzgebiete, Jena, vi. 1.

This is a report of nineteen cases of traumatism and seven cases from other causes. Of the latter we find endocarditis, with embolism or atheroma. Surgical operations were successful in 75 per cent. All other cases medically treated were fatal. In performing nephrectomy it is preferable to make it transperitoneal. The diagnosis is difficult to make, and neoplasms, hydronephrosis, and hematonephrosis must be occluded. Two cases in this country have been published by Keen and Armstrong.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Treatment of Deafness of Middle Ear Origin.

In the discussion of this important subject, Dr. Charles Watson, Edinburgh (*Annals of Otology, Rhinology and Laryngology*, November, 1902) offers the following principles of

The promotion and maintenance of a more vigorous circulation in the middle ear with the view of (a) increasing the resisting powers of the tissues, and (b) promoting the absorption of morbid products where possible. He believes that not enough is attempted in the way of judicious stimulation of the middle-ear structures. The present practice appeals to him to be too much restricted to momentary stimulation effected by the use of Politzer's bag or the catheter.

The maintenance of thorough aëration of the naso-pharynx and middle ear. This acts favorably, not only through its influence on the tension of air in the tympanum, but also by its action in maintaining a healthy state of the circulation in the middle ear and of the secretory glands in the mucous membrane of the naso-pharynx, the restoration of a greater degree of flexibility to the tympanic membrane and associated structures.

The Endothelial Phagocytes of the Tonsillar Ring.

There is abundant evidence that in the normal tonsil, both of man and of a variety of the lower animals, large mononuclear phagocytes are present which appear to be derived from a proliferation of the endothelial cells of the reticulum. (J. L. Goodale, *Annals of Otology, Rhinology and Laryngology*, November, 1902.) In hyperplasia of the tonsils there is a proportionate increase in the proliferation of the endothelial cells of the reticulum, and formation of phagocytes, without, however, a corresponding increase in the number of lymphoid cells, or in the endothelial cells of the blood vessels. In atrophy of the tonsils, the endothelial cells of the follicles are seen first to diminish in number, and endothelial phagocytes are correspondingly few, while the lymphoid cells persist relatively longer. In acute inflammation, the characteristic feature of the process consists of a heightened proliferation of the endothelial cells of the blood vessels, with swelling of their cytoplasm, together with an increased number of lymphoid cells. These changes are relatively more marked than the increased endothelial proliferation of the reticulum with follicles. Where circumscribed abscess formation occurs in the follicles, an increased proliferation of the endothelial cells, both of the

reticulum and the capillaries, is observed in the vicinity. Where an intense irritant acts upon the endothelial cells of the tonsil, degeneration and necrosis result in the immediate vicinity. At a greater distance proliferation appears to be excited in these cells. It seems, therefore, probable that proliferation of the endothelial cells of the reticulum, with a formation of phagocytes, is not necessarily dependent upon the influence of bacterial toxins for its production, but appears rather to stand in definite relation to the size or activity of the organs in question. Proliferation, on the other hand, of the endothelial cells of the blood vessels was found to occur only in association with other phenomena of inflammation.

Traumatism During Adenoid Operations.

While the operation for adenoids is a simple one in trained hands, there is abundant evidence that it should not be undertaken by the inexperienced. (W. F. Chappell, *Laryngoscope*, December, 1902.) The posterior portion of the septum is apt to be torn off by the tyro, and it is said that the eustachian prominences may be injured. The latter accident should not occur if proper attention is given to the well-known methods of localization. It is important to take the body temperature of the patient before doing an adenoid operation, as in this way one was often warned of an approaching attack of some acute disease, such as measles. Minor traumatism may easily be inflicted upon the soft palate. Complete rupture of the soft palate must, however, be extremely rare. Such a case is reported, the accident having occurred before the patient came under observation. There was an irregular tear in the soft palate extending from the free margin upward and to the left to the hard palate. The boy seemed very dull and some fluids regurgitated through the nose. The boy became very anæmic and emaciated during the summer. By experiment on the cadaver, Dr. Chappell states that he had found it impossible to rupture the soft palate with the finger, and only with great difficulty by the use of the large forceps.

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Red Light Treatment of Smallpox.

Schamberg states that there are numerous facts which militate against the correctness of Finsen's views in regard to the influence of ultra-violet light in producing pitting of the skin in smallpox. While prolonged exposure to the direct solar rays, particularly in the hot months of the year, commonly induces inflammatory reaction, yet there is no evidence

of such noxious influence by ordinary exposure to diffuse daylight. He points out that smallpox is essentially a cold weather disease and the months in which it flourishes most are characterized by cloudy skies and the presence of but little direct sunlight. He finds it difficult to believe that ordinary exposure in the sickroom to diffuse winter daylight could result in any irritative action on the skin. If Finsen's theory is the correct one, summer smallpox should be more severe than the winter type for the actinic rays of the sun are stronger in the summer than the winter. If there is any difference, it is as a rule milder in the summer, for during this season the epidemic influence is usually absent.

Finsen's theory that the predilection of the smallpox eruption for the face and upper extremities is due to their exposure to the light Schamberg regards as untenable as it would be difficult to explain upon this theory the extensive involvement of the feet, which are often attacked as suddenly as the hands. The explanation Schamberg believes is to be found in the greater vascularity of these parts. If a part is congested by sunburn or the application of an irritant before the eruption appears, the lesions are augmented but irritation after its appearance does not influence it unfavorably. If Finsen's theory as to the action of iodine or nitrate of silver, yellowing and blackening the skin respectively, thereby preventing the passage of the chemical rays were true, the negro, whose skin abounds in pigment, should suffer less than the white, which medical literature disproves, however. Schamberg attributes the scarring of the skin or its prevention, not to any form of treatment, but to the vaccinal condition of the patient and the severity of the disease. In mild epidemics the skin lesions are superficial and scarring does not occur. He regards the prophylactic treatment of smallpox, *i. e.*, vaccination, as the most important in the prevention of scarring. The results obtained in one hundred and fifty cases, in Denmark, Norway, and Sweden, as collated and reported by Finsen, were favorable in every instance save one. On the other hand, Juliet Renoy of Paris has obtained no such favorable results as reported by the Denmark, Norway, and Sweden physicians.

In the winter of 1902 Schamberg, in connection with Dr. Wm. M. Welch, fitted up a room for the red light treatment of smallpox in the Municipal Hospital, Philadelphia. This room was complete in its appointments; the window panes were of a ruby red color, the gas jet surrounded by a red globe, the walls of the room were painted a deep red and the inner doors were covered with red curtains, so as to completely exclude the light of day.

Two unvaccinated young men, *æ*t. sixteen and twenty respectively, who started with profuse eruptions, were placed in this room about the third day of the eruption before the lesions

had become frankly vesicular. The course of the disease was in no wise different from that seen in the patients treated in the general ward. The pustules filled up and became confluent, the secondary fever was high and protracted, and the patients markedly delirious. One of the young men, a private case, had a special nurse night and day with every attention, but died. The other recovered with disfiguring scars.

Two cases should not, perhaps, be cited to offset one hundred and fifty cases, but Schamberg believes that other factors may be accountable for the good showing. What some physicians regards as severe smallpox, others look upon as of moderate severity. The eruption may be extensive as to area, but not deep-seated. Again, Denmark, Sweden, and Norway are the best vaccinated countries in the world, and finally he regards it as illogical to definitely attribute favorable results to certain measures employed in the treatment of smallpox in persons once vaccinated. The statement which appeared in one of the popular magazines recently, in regard to Finsen and his work, that "all the world might have smallpox now without fear of disfigurement," we regard as a most dangerous one, which, in the interests of scientific truth, should be challenged.—*Jour. of Am. Med. Asso.*, May 2, 1903.

Novelties in the Physical Treatment of Skin Diseases.

Freund in an article on the above subject states that for an effect upon the deeper tissues, rays of large wave lengths are necessary. Just as in music the deeper tones with large wave lengths are conducted over longer distances, even through walls, than the higher tones, so, too, transverse ether vibrations of larger wave length are carried through certain media more easily than those of shorter wave length. He believes, therefore, that we should examine the rays of larger wave length, the blue and red rays, to determine whether they possess any influence upon living tissues and what that influence is.

The microbicidal effects of the light rays obtained by Finsen were secured by the action of those rays upon colonies of bacteria in plate cultures. In photo-therapeutic procedures the conditions are different. The bacilli are localized deep in the tissues of the ultra-violet rays must first pass through a relatively thick absorbing layer before they reach the bacteria. That this might happen under certain circumstances Freund believes, but in order that it should the intensity of the ultra-violet rays must be very great, the exposure very long, and one can well believe that the superficial layers which have been pierced by these rays would be severely injured.

That other elements of concentrated light, of large wave length, which exert no such markedly injurious influence on the tissues and more easily reach the deeper tissues, have a curative effect, we find much easier of belief.

As a result of his investigations in the Anatomopathological Institute of Weichselbaum, he found that ultra-violet light from an apparatus similar to that of Finsen, and with from sixty to seventy-five amperes of current, produced no such bactericidal action, when passed through living tissue. The ear of a black rabbit was stretched over the focus of the radiating cone of light, with a plate culture of *staphylococcus pyogenes aureus* behind it, the plate so arranged that the radiating cone of light, passing through the ear, affected about as much of the culture as the thumb nail would cover. The culture was placed in the incubator after an hour's exposure, but no variations in growth were noted the next day, the plate being uniformly covered by colonies of the bacteria. A similar experiment with the ear of a white rabbit, in which there could be no pigment to prevent penetration, likewise gave an absolutely negative result. A third experiment was made, in which the ear was kept moistened by adrenalin to create anæmia. This was also negative and showed that, while the anæmic condition from the adrenalin was marked at first, the influence rapidly disappeared and the animal showed symptoms of intoxication. Inflammation of the exposed ear in all three instances developed in twenty-four hours.

Freund concludes that, with lenses of quart, greater amperage, and longer exposure, it is possible that the rays passing through the skin might exert a bactericidal action, but that they would also have an injurious effect upon the tissues through which they passed and would, therefore, be of no therapeutic value. Further experiments showed that the heat rays from sunlight, filtered through a *lavette* on the hottest day of summer, 31° to 54° C., after a six hours' exposure, caused not the slightest delay in the development of the bacteria.

Still further investigations have convinced him that the heat waves (of large wave length) exert a favorable influence in some skin affections. Intense red light, long continued, favorably affects acne vulgaris, leg ulcer, etc. The effect Freund believes to be similar to that produced by hot compresses; that the heat stimulates the cells of the connective tissue to proliferation and so to the formation of cicatrices. At any rate the rays of heat are more suitable than thermometric heat, since the rays penetrate into deeper layers than moist heat applied locally.—Philadelphia Med. Jour., May 9, 1903.

Freund's experiments cannot be regarded as convincing, as the conditions under which they were made were evidently not identical with those of Finsen, *i. e.*, high amperage, quartz lenses, and prolonged exposures. Still they bear the impress of truth and when taken in connection with Schamberg's observations upon red light and smallpox are very suggestive.

The clinical results obtained in the writer's experience, in a considerable range of pathology, from exposure to all the radiant energies of the arc, has always suggested that other influences than the chemical rays of light were active. There is a vast deal of experimental work yet necessary in order to determine the truth.

By the action of the high frequency or ultra-violet waves of light little things in their paths, such as molecules, are agitated and by the profound agitation of bacteria their death is presumed to result, but it is not probable that this occurs immediately. It must, after all, be a gradual process, just as the larger animal shakes or worries the smaller to death and meanwhile the effect of the larger wave lengths, some of which may be in synchronism with the vibration of molecules, tends to influence nutritional changes, thereby fortifying the system against the encroachment of its especial foe.—Editor.

The Roentgen Ray a Light Vibration.

Recently M. Blondelot has adduced evidence going far to prove that the Roentgen Rays are capable of polarization, if they have not been polarized already, and can, therefore, be traced in the spectrum. If in addition the rays are transversal, as M. Blondelot thinks, it follows that they are a species of light, but of extremely short wave lengths, perhaps a hundred times shorter than the waves of light one can see.

Lord Rayleigh, Professor of Natural Philosophy at the Royal Institution, London, sees no reason to question the experiments of Blondelot.

From the clinician's point of view there seems but little doubt of the identity in kind of the X-ray and light vibrations.—Editor.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

The Therapeutical Value of the Roentgen Ray in the Treatment of Pseudoleucæmia. By N. Senn, M. D., Ph. D., LL. D., in the New York Medical Journal of Saturday, April 18, 1903.

Two cases are reported. Case I. F. B., forty-three years of age, a saloon-keeper and farmer by occupation. Residence, Brillion, Wis. The glandular affection dates back a year, hav-

ing commenced in the cervical region almost simultaneously on both sides, and involves now very extensively the glands of these localities, as well as of the axillary and inguinal regions. A macular eruption of the skin all over the chest, back, and abdomen. The increased respiratory movements and dulness over the anterior mediastinum indicate the extension of the disease to the bronchial and mediastinal glands. Spleen considerably enlarged. Liver dulness slightly increased. No tenderness over the junction of the gladiolus with the ensiform cartilage of the sternum or epiphyses of the long bones. The patient is anæmic, but not emaciated. The blood examination shows anæmia, but no abnormal blood cells. At the examination made at 11 A. M., the pulse was 78, respiration 22, and temperature 99° F. I prescribed as usual, arsenic and iron, and, in view of the heretofore hopelessness in such cases, advised in addition the use of the Roentgen ray. The Roentgen therapy was referred to Dr. W. F. Buttermann, who is in charge of this department at the St. Joseph's Hospital. As this was the first case of pseudoleucæmia in the institution to be subjected to the X-ray treatment, Dr. Buttermann took the precaution to inform the patient that in all probability the treatment would result in more or less severe burns, owing to the fact that glands in the chest would make it necessary to resort to somewhat vigorous use of the ray. Patient received thirty-four treatments, as follows: Right side of neck one minute, left side of neck one minute, neck from before backward one minute, neck from behind forward one minute, each axilla one minute, each groin one minute, spleen one minute. Daily sitting for the first ten days; sixty volts, eight amperes were used each day; distance of tube from surface twelve inches, a medium vacuum tube being used. The treatment was commenced March 29, 1902. On April 7, after ten treatments had been given, the glands had undergone a noticeable reduction in size. At this time the patient made complaint of an intense itching all over the chest and a uniform redness made its appearance over the chest and axillary regions. The voltage and amperage were reduced to forty-two and six respectively. After the next six treatments the voltage was again reduced to twenty-eight, amperage remaining the same. April 15. The itching became so severe that it kept the patient awake all night. The skin of the chest blistered. The skin of the neck, naturally very dark, turned dark brown. A five per cent. boric acid vaseline ointment applied twice a day relieved the itching.

From April 16 to 23, the exposures were limited to the neck, back and groins, as the chest and axilla were the seat of quite an extensive burn. April 24. All of the glands subjected to the X-ray treatment have nearly disappeared. The face and part of scalp exposed to action of the X-ray are devoid of hair. Axillary and pubic hair has also disappeared. Skin of neck

dark brown and blistered. The skin of the chest from the neck down to about four inches below the nipples exfoliated in several places. The nipples are very sore, discharging pus. The treatment was suspended and the patient discharged from the hospital with instructions to continue the use of the salve and internal medicine. Two weeks later he returned to the hospital for more medicine and expressed himself as feeling well. His appetite was good and he was able to attend to his duties. No enlarged glands could be discovered. No elevation of temperature. Breathing much improved. The dermatitis had improved. He returned a second time on August 1, as he had recently noticed a slight enlargement of the cervical and axillary glands. He is feeling well and is able to attend to all of his business. Dermatitis has disappeared. Return of hair growth. Patient received ten daily treatments, twenty-eight volts, six amperes; each group of glands was exposed for two minutes at a distance of twelve inches, tube the same as before. The glands disappeared promptly. No return has taken place since, the patient being in perfect health, with the exception of a joint affection which has no connection whatever with the pseudo-leucæmic process.

Case II. The second patient, C. W., Balekon, Mo., presented himself at my surgical clinic, Rush Medical College, during the spring semester, 1902. He is fifty-three years of age, and is a merchant by occupation. Family history excellent. He has ten brothers and ten sisters, all of them in excellent health.

The patient has enjoyed good health until the beginning of the present illness. Ten years ago he noticed a slight enlargement of the glands of the neck. The enlarged glands were found on both sides of the neck, behind and below the angle of the lower jaw. The glandular swellings were hard but not painful and tender on pressure. Soon afterward the tonsils became swollen and painful. A little later the glands in the back of the neck, axillæ, and groins, became similarly affected. He lost his appetite, became anæmic, and lost forty-five pounds in weight. To regain his health he went to the mountains in Utah, where he lived an outdoor life for several months. The physicians who treated him at the time prescribed arsenic, iodides, and cod-liver oil, with no apparent effect. At the end of the year the glands became softer, but did not diminish in size. His appetite improved, and he gained in weight. The glands gradually increased in size until some of the cervical glands had reached the size of a hen's egg, when he applied at the clinic for relief. The size of the glands of the neck and axillary regions was much enlarged. A chain of smaller glands extended from the axillæ to the epitrochlear regions. Some of these trochlear glands had reached the size of a chestnut. The glands of the groin on both sides, above and below Poupart's ligament and along the iliac vessels, greatly enlarged.

A gland the size of a hen's egg can be felt in the abdomen to the right of the umbilicus. Liver palpable below the costal arch, its surface and border smooth. Spleen enlarged but not palpable. Sternum tender on pressure, but no dullness on percussion. Both tonsils markedly enlarged; mucous membrane of pharynx and cavity of mouth pale. Chest and urine examination negative. Blood examination: Hæmoglobin, 73 per cent.; erythrocytes, 3,875,000; white corpuscles, 208,000. A differential count of the white corpuscles gave the following result: Small uninuclear lymphocytes, 78.75 per cent.; large uninuclear lymphocytes, 14.25 per cent.; transitional forms, 2.00 per cent.; multiforminuclear, 5.00 per cent. Increasing doses of Fowler's solution were given for ten weeks when, owing to a gastric disturbance, the drug had to be discontinued. The X-ray treatment was conducted by Dr. Joseph F. Smith, resident physician at the Presbyterian Hospital. The X-ray was applied to the neck, axillæ, elbows, chest, abdomen, and groin of each side every alternate day. A fairly hard tube was used at a distance of three to four inches from the surface of the skin. The applications were continued for from five to seven minutes at each sitting over each area exposed. After four or five sittings the patient noticed an unusual softening of the glands and a gradual diminution in their size. After fifteen treatments a slight dermatitis appeared; at the same time general symptoms pointed to a slight toxæmia. He lost his appetite and the anæmia increased. The treatment was suspended and the patient was advised to return to his home. In three weeks he returned much improved in his general health, having gained eleven pounds in weight. All the palpable glands were found very much diminished in size and the skin markedly pigmented over the areas exposed to the action of the X-ray.

The blood examination made at this time showed: Hæmoglobin, 85 per cent.; erythrocytes, 4,450,000; white corpuscles, 76,000. The applications of the X-ray were resumed in the same manner as in the first series of treatments, with the difference that the time of exposure was lengthened to seven minutes. After twelve treatments the patient developed again a slight dermatitis of the exposed areas, with very marked pigmentation of the skin and loss of hair and beard. The symptoms of toxæmia were more pronounced than after the first series of applications, so that it was deemed advisable to discontinue further treatment. The appearance of the patient at this time was much improved. Only one small gland could be found above the right clavicle, and a second one behind the upper portion of the sterno-mastoid on the same side. A few small epitrochlear glands could be detected, but the axillary region on both sides was free. The glands in the groins had almost entirely disappeared, as well as the abdominal glands.

The blood count now showed 46,500 white corpuscles. The spleen could be palpated below the costal arch and extended to within a finger's breadth of the crest of the ilium. No diminution in the size of the liver.

There can be but very little doubt that the constitutional disturbances which followed the prolonged use of the X-ray, and which set in simultaneously with the progressive diminution in the size of the glands were due to a toxæmia caused by the absorption of the products of degeneration of the pseudoleucæmic product. This toxic condition unquestionably was likewise the cause of the increased enlargement of the spleen noted after the second series of applications. This patient has been heard from very recently, and he believes that there are no indications of the return of the disease and considers himself in perfect health.

The eminent success attained in these two cases by the use of the X-ray can leave no further doubt of the curative effect of the Roentgen therapy in the treatment of pseudoleucæmia.

Additional experience will give us more definite information as to the best methods of using the Roentgen ray in the treatment of this disease, with a view of preventing burns and toxic symptoms without reducing its curative effect.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

Instantaneous Radiography. By Wihrau K. Kassabian, M. D., Philadelphia, Pa.

By this we mean that a skiagraph can be taken with great rapidity of any part of the body. The time exposure depends largely upon the apparatus (size) employed (coil or static), the degree of vacuum of the tube, and lastly upon the thickness of the part that is X-rayed. The length of time of each exposure has gradually been reduced from two hours (the length of exposure at the time X-rays were discovered by Roentgen) to as many seconds. The unit of time now used by me is one second, this being the time required to skiagraph a hand, and hence the time of exposure necessary to skiagraph such parts as the kidney, hip, skull, lungs, etc., varies in direct proportion with the thickness of the hand. The following table will give an idea of the time of exposure I employ for skiagraphy:

	Seconds		Seconds
Hand	1	Wrist	2
Forearm	3	Shoulder	10-15
Foot	5-6	Elbow	3-5
Knee	10-15	Ankle	5-6
Face	10-15	Hip	40-60
Thorax	20-30	Abdomen	50-90

This standard of exposure was obtained after prolonged experimentation, upon individuals weighing between 125 and 145 pounds. With increasing weight (say for each fifteen pounds), an addition of one to two seconds should be estimated.

The apparatus used by me is a 15-inch Queen coil. The tube should be of high vacuum. The distance of the anode and the surface of the part to be radiographed should be from twelve to fifteen inches. The plates used are specially prepared for X-ray work, manufactured by Cramer Co. of St. Louis. No intensifying screen being used, all clothing should be removed and the part laid bare. With static machine the exposures should be slightly prolonged. In using static machines the time of exposure depends upon the size and number of revolving plates and the number of revolutions per minute. I have used a mica plate machine, which can stand a high speed of revolution without danger of breaking the plates.

After the plate has been exposed for the above given length of time, it must be developed, and here is the point where individual skill is highly important. Most of the X-ray experts seem to be lacking in the knowledge of how to develop the plate after it has been properly exposed. For their benefit I deem it expedient to give the following hints: The developing solution should be slightly stronger than the ordinary photographic formula. After the oxidizing power of the solution has been lessened, a new solution should replace the old, and the time of development should be lengthened, exercising care not to fog the plates. I shall contribute a more detailed report after completing my experiments in this line of work.

[We have tried the short exposures the doctor recommends, but, so far, with our 12-plate static machine, we obtain best results by counting our exposures in minutes instead of seconds. To take a clear picture of the hand, for example, we find that a two-minutes' exposure is necessary with the static machine. We have no doubt that with a good coil and a high tube the exposures need be very short. The skill in developing the plates, as the doctor says, is "undoubtedly a great factor in successful radiography."—H. G.]

MECHANICAL-VIBRATION THERAPY.

EDITED BY LUCY HALL-BROWN, M. D.

A "Diagnostic and Treatment Chart" in Connection with the Report of a Case of Acute Melancholia. By the Editor.

Physicians employing vibratory stimulation either singly or

as an adjunct to other agents in the treatment of disease make their deductions to a large extent from the pressure response of the nerves in the spinal cord. In other words the area of hypersensitiveness on the one hand or marked muscular contraction on the other are sought along the spinal column and when disclosed are stimulated by mechanically produced vibrations. The disease from which the patient is suffering will, in the preponderating majority of cases, be found to be reflected neurally, so to speak, in the spaces between or around the transverse processes of the vertebrae and disclosed by response to tolerably deep pressure. Increasing experience will lead the practitioner to rely more and more upon this method of making his determinations in advance of his application of the actual treatment. As his practice widens, the necessity for keeping a record in brief but comprehensive form, that shall show him almost at a glance, the affected spinal area, will become apparent. Reference to it will be found to be a great convenience if not an actual necessity throughout the entire course of treatment of a given case.

Attention is invited to a printed chart (reduced to one-fourth size) devised by the writer. Indicated on the chart are the affected spinal areas according to their vertebral divisions and numbers. This serves the double purpose of a record of the site of original affection and as a guide to the subsequent application of treatment. These charts may be numbered, indexed and filed so as to admit of ready reference to them at any time. When treating a case the individual chart is placed where it can be readily seen.

The case here presented was one of very pronounced acute melancholia which had proved refractory to every form of treatment previously instituted. While it is submitted here to show the writer's method of making these individual records, its clinical features should not be overlooked.

Treatment was applied, as will be observed by referring to the chart, solely to the affected nerve centres in the spine where muscular contraction and sensitiveness to deep pressure indicated its necessity. Relief followed the first application and a cure resulted after a course of ten treatments.

In submitting this record for purposes of illustration an answer is embodied to the inquiries of a number of medical practitioners regarding reasons and authority for predicating

Miss - Charls
123 City St. - N.Y.
 Age 23..

DIAGNOSIS
 acute melancholia.

AFFECTED CENTRES

Contracted muscles and
 corded tendons from 1st
 cervical to 5th dorsal in-
 clusive.

Separation between 11th
 and 12th dorsal.

Sensitive at 5th lumbar.

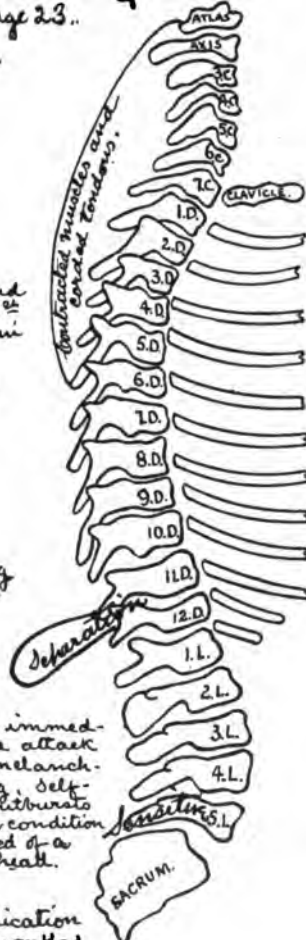
TREATMENT

Use the Ball heavy along
 spine and light over
 atlas median line.

HISTORY In July 1902 immedi-
 ately following a severe attack
 of typhoid fever acute melanch-
 oia developed. Weeping, self-
 abasement and wild outbursts
 of fury characterized her condition.
 She constantly complained of a
 dreadful feeling in her head.

REMARKS

The first application
 of the vibrator gave marked
 relief. She said "my head feels
 better" after the third treatment she
 came to the office without an
 attendant bright and smiling.
 She was cured after ten treatments.



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a diagnosis and instituting treatment in a given case largely upon disclosures of spinal conditions as above noted.

Besides the repeatedly demonstrated fact that the irritated spinal centers do respond both to diagnostic and therapeutic manipulation—first by digital pressure and second by vibratory stimulation, the writer would call attention to the warrant for these conclusions as embodied in most of the recent works on physiology.

In regard to this particular case, while it is evident that the melancholia was due to interference with normal cerebral circulation consequent upon marked muscular contractures over and interfering with the vaso-motor areas supplying the head, the following quotations from two of our leading authorities on physiology are submitted.

Kirke, page 278,* "The velocity of blood-flow through the brain is thus influenced markedly by the condition of the vessels of the splanchnic area."

Again on page 279, he says: "It is not the volume of the blood, but the velocity of flow which is altered in the brain by changes in the general circulation. The brain with its circulating blood almost entirely fills the cranial cavity in the living animal; that is, there is no more cerebro-spinal fluid there than is sufficient to moisten the membranes."

Again, Kirke, page 299.

"The vaso-constrictor nerves for the whole body leave the spinal cord by the anterior roots of the spinal nerves from the second thoracic to the second lumbar, both inclusive. They leave the roots by the white rami communicantes and pass into the ganglia of the sympathetic chain which lies on each side along the front of the vertebral column. The ganglia on this chain (the lateral ganglia of Gaskell) may also be called the chain of vaso-motor ganglia, because here are situated cell stations on the course of the vaso-constrictor nerves for the head, trunk and limbs. That is to say, the small medullated nerve-fibers terminate by arborising around the cells of these ganglia, and a fresh relay of axis-cylinder processes from these cells carry on the impulses."

Again, Kirke, page 300.

"The vaso-constrictor nerves, however, have all cell stations somewhere in the sympathetic system, and the new axis-cylind-

* "Handbook of Physiology," 17th edition.

ders that arise from the cells of the ganglia differ from those which terminate there in the circumstance that they do not possess a medullary sheath, but they are pale, gray, or non-medullated fibers. Those which are destined for the supply of the vessels of the head and neck pass into the ganglion stellatum or first thoracic ganglion, thence through the annulus of Vieussens to the inferior cervical ganglion, and thence along the sympathetic trunk to their destination. Their cell station is in the superior cervical ganglion."

Sir Michael Foster,* M. D. (Foster's "Text-Book of Physiology"), says:

"If the spinal cord be divided between the roots of the fifth and sixth dorsal nerves (that is to say, at the level where the path of the splanchnic fibers from the cord seems to divide (see Fig. 77) those issuing above, pass upward to the fore limbs and head."

Various experiments seem to have failed to demonstrate with certainty the existence of special vaso-motor nerves or fibers directly governing cerebral vessels. On this point Dr. Foster says:

"It is argued that in the absence of vaso-motor nerves of their own, the cerebral vessels are wholly, so to speak, in the hands of the general vaso-motor system, so that when the blood-pressure is high owing to a large vaso-constriction in the abdominal viscera, more blood must necessarily pass to the brain, and when again the blood pressure falls through the opening of the splanchnic flood-gates, less blood necessarily flows along the cerebral vessels. And indeed one may recognize here a sort of self-regulating action; for diminishing the supply of blood to the vaso-motor center in the bulb acts, as we know, as a powerful stimulus in producing vaso-constriction and so leads to a rise of blood pressure; but this very rise of blood pressure, drives more blood to the brain, including the bulb, and thus the injurious effects to the brain threatened by an anæmic condition, are warded off by the very beginning of the anæmia itself. All these advantages are, however, quite compatible with the coexistence of special vaso-motor mechanisms."

It will thus be seen in the case submitted that by relieving the nerve pressure due to muscular contracture, and at the same time stimulating the vaso-motor areas, the normal equilibrium

* Pages 223, 737.

of the cerebral circulation was re-established. The result in the case cited, it will be observed, followed very closely as the natural corollary of the practical application of the theoretical propositions of Kirke and Foster, as quoted above.

Frequent citations from writers on physiology of acknowledged authority in support of the application of the theory of spinal localization of disease as above outlined may be found in condensed form in a very recent publication by Maurice F. Pilgrim, M. D., Professor of Psychiatry in the N. Y. School of Physical Therapeutics (Metropolitan Pub. Co., 112 Chambers Street, New York City).

LUCY HALL-BROWN, M. D.

DIETETICS.

EDITED BY SIGISMUND COHN, M. D.

The Administration of Calcium Salts in Nephrolithiasis due to Uric-Acid Calculi. By Alfred C. Croftan, of Chicago, Journal of the American Medical Association, Chicago, March 28, 1903.

Phosphoric acid forms three salts with sodium, (1) mono-sodium phosphate; (2) di-sodium phosphate, and (3) the tri-sodium phosphate. In the urine we find normally the mono- and the di-sodium phosphate. Uric acid is soluble in di-sodium phosphate, but it is not soluble in mono-sodium phosphate. Therefore the solubility of uric acid depends upon the presence of a sufficient quantity of di-sodium phosphate in the urine. This can be accomplished in two ways, first, by decreasing the phosphoric acid in the blood entering the kidneys, second, by increasing the sodium in the blood; for the smaller the proportion of available acids to available bases the greater the tendency to the formation of basic salts.

First, the decrease of phosphoric acid in the renal blood. The phosphoric acid of the blood is derived from three sources, (1) phosphoric acid is ingested in the form of phosphates with the food, (2) the proteids, and especially the nucleo-proteids, contain phosphorus which is oxidized in the organism into phosphoric acid, (3) in a similar manner phosphoric acid is derived by the catabolism of the body-tissues.

We can control the first two sources of phosphoric acid by eliminating from the diet all the foodstuffs which contain phosphorus, but the third source of phosphoric acid can only be controlled indirectly, and this is done by the administration of calcium salts. Calcium forms with the alkaline phosphates in our food insoluble salts, and that is one way to prevent the absorption of this moiety into the blood; but much more im-

portant is, that calcium possesses a great affinity for phosphoric acid and combines with it to form calcium phosphate. It will therefore not only attract the phosphoric acid derived from the disassimilation of the food-proteids, but also the phosphoric acid which is formed by the catabolism of the body-tissues. The calcium phosphates formed in this way are then eliminated from the body, but—and this is another important point—not through the kidney, as the other salts are, but through the intestines. The consequence is that the urine is not necessarily made alkaline.

Therefore calcium given by the mouth will first prevent the entrance of preformed phosphoric acid from the food into the blood, and, secondly, will prevent the phosphoric acid formed in the organism from passing into the urine by eliminating it through the intestine.

Second, the increase of the sodium in the renal blood. This object is best accomplished by the administration of sodium salts by the mouth, but, by so doing, the urine will be rendered continuously alkaline, and this is dangerous for various reasons, and will certainly occur if the doses of the sodium salts are large enough to convert all the mono-phosphate of the urine into di-phosphate. The normal urine is faintly acid and should be kept so. Calcium salts will never render urine alkaline.

Therefore the administration of large doses of sodium salts for long periods of time is not to be recommended, and in fact is superfluous, as the calcium salts, by decreasing the phosphoric acid of the urine, cause a relative increase of the sodium, without rendering the urine alkaline.

The author considers calcium carbonate the best preparation, and he gives it in doses of fifteen to twenty grains, three times a day. Von Noorden advises even as much as fifteen grams a day, and claims never to have seen any ill effects from this treatment. A more convenient form of administration would be in the way of the natural mineral waters, as Contrexville, Wildungen, and Fachingen. Among domestic waters the choice is difficult.

The diet of course takes an important part in the treatment of nephrolithiasis, and the author has treated this subject in a former paper: "The Modern Basis of Dietetic Treatment in the Uric Acid Diathesis."

In conclusion the author thinks it very important that no mistake is made in regard to the renal calculi being really composed of uric acid, and he gives his own method of easy and quick diagnosis. He reports four cases of his own and twenty-one cases of Dr. von Noorden's which had been treated with calcium salts, and with two exceptions had shown marked beneficial results. Therefore he thinks that the treatment is very efficacious and deserving of further trial.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

De Forrest Willard (Phil. Med. Jour.) recommends the ordinary electric-light bulb attached to a long wire, for use in applying heat to an affected area, the heat being readily regulated by wrapping in one or two layers of cloth of necessary thickness. It has the advantage of quick and continuous service, and is useful in local pains in the abdomen or chest, also neuralgic pains in the head; and, applied to the interscapular region, gives comfort in beginning of a chill.—Modern Medicine.

Bedford Fenwick (British Gyn. Jour., August, 1902) for some little time past, both in private and in hospital practice, has been giving his patients a glass of water three or four minutes before placing them on the table for ether anesthesia; and another as soon as they recover consciousness. These patients brought up a considerable amount of frothy water; but did not seem to be so sick as patients generally were who had ether anesthesia without water. The lessened sickness was confirmed by his colleagues and by the nurses. The after irritation of the stomach was lessened by the presence of the water to absorb the ether. But a large amount of sickness after ether anesthesia was due to regurgitation of the bile, and he therefore almost invariably directed the patient to have five grains of calomel the night before the operation, as well as the ordinary purge in the morning.—Modern Medicine.

Pressly (Maryland Med. Jour., June, 1902) obtained excellent results in the use of the continuous bath in lacerated wounds and burns.

The water should be clean, preferably running, warmed to about the body temperature, and should have a specific gravity approaching that of blood serum. In addition to adding warm water every half hour, it is necessary to change the entire volume of water three or four times in twenty-four hours. The specific gravity may be raised to approximate 1028 by the addition of one dram of common salt to the quart of water. Boracic acid may be added for its antiseptic influence.

The advantages claimed for this method are: (1) that the warm water is an anodyne, (2) that the afflicted member, being floated by the water, may be comfortably moved by the patient, (3) that the odor from offensive wounds is controlled better than by any other way, (4) that it constitutes the most perfect drainage obtainable. The bath should be kept up intermittently or continuously until the wound is protected by granulation tissue.—American Medicine

Granger (New Orleans Med. and Surg. Jour., July, 1902)

reports several cases of oozing after abdominal operation, in which the discharge from the drainage tube was greatly lessened by the use of an ice-bag outside the dressings. He recommends its use as a routine measure after all abdominal operations, especially when there has been much manipulation of the abdominal contents, or when there is reason to expect much oozing.—Modern Medicine.

Resuscitation after twenty-five minutes under water. Superintendent Kimball, of the life-saving service, has received a report from Captain Ludlam, of the Hereford Inlet Life-saving Station at Anglesea, N. J., to the effect that Stanley Holmes, five years of age, was resuscitated after being under water for twenty-five minutes. It is said that the Superintendent has investigated the case, and finds the time corroborated by all the witnesses, including a nurse.—American Medicine, August 2, 1902; Modern Medicine.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

The Psychical Conditions of Hypnosis.

Dr. Th. E. Rybakoff (Roussky Vrach, January 25th and February 1st) exhaustively discusses the question of the conditions of the "psychical sphere" which induce and facilitate the production of hypnosis. He holds to the idea (unfortunately not generally entertained by the great majority of the profession) that the production of a condition of hypnosis is not essentially dependent upon the exercise of certain physical influences, such as fixation of the attention upon a material object, "passes," etc., but that concentration of thought upon one idea alone is sufficient to induce the hypnotic state.

Physicians, of all men, are the most prone to attempt to look at everything extra-physical, through the darkened mirror of materiality. This is doubtless because so much of their lives is spent in the contemplation of the things that appeal alone to the material sense. When such an one comes to consider the phenomena of hypnosis or the "subjective state," the same material idea is dominant, and it is assumed that the induction of this condition is dependent upon the performance of some physical act. As a matter of fact, beyond gaining the patient's attention (through "fixation," for example), there is little utility in any of these mere physical acts. Whether it is believed or not, the idea or suggestion which dominates the

subject or patient and finally puts him to sleep, is mental or psychical, originating in and transmitted from the mind of the operator to the recipient, and not the physical acts performed or words spoken at all. It is nothing more nor less than a telepathic command reinforced by certain psychical stimuli thrown off from the operator. Words *alone* have very little effect except in so far as they enable the operator the better to energize his mental or telepathic command which, to be effective must always be peremptory. Mental firmness and confidence (faith) are prime essentials to success. It should be remembered that it is a *psychical*, not a physical, impression that overcomes the material senses and so induces in the patient, hypnosis or the psychologic state. It is precisely the same in all forms of psychic treatment whether with or without hypnosis. The command which initiates the curative process in the patient's organism, is always telepathically (psychically) transmitted and is never really conveyed through physical agencies. This statement admits of no exceptions and cannot too often be reiterated to the student or amateur in the practice of psycho-therapy. He will do well never to let it pass out of his mind, even for an instant, although it will not be found the easiest thing to do when it is attempted. Material things—oral vocable, for instance—are so much more tangible to the tyro than psychic force.

The writer from whom we are abstracting, proceeds further to say that a certain emotion is requisite and essential for the development of the hypnotic state. This emotion is specific in character, and is closely related to the emotion of external influences. The presence of such an emotion during the act of hypnotization is shown by the increase in the pulse rate and the rate of respiration in the persons hypnotized, by the subjective sensations described by intelligent persons who have been hypnotized, and in the occurrence of fatigue after hypnosis. All other circumstances which attend the act of hypnotization are only of assistance to the hypnotizer in so far as they induce or assist the development of the emotion which underlies hypnosis. The emotion of hypnotic sleep does not arise without some cause to induce it, just as is the case with any other emotion. In other words, in order to hypnotize a person we must put his mind into such a state as to evoke the emotion of hypnosis. The rôle of the idea of sleep, which is so much im-

sisted upon by the Nancy School, is simply that of a signal which heralds the onset of the emotion of hypnosis, which is analogous to the emotion of fear, expectation, etc. The fact that hypnosis can be induced much more easily after one or two séances shows that the mind is accustomed to the signal, whatever it may be, and at that signal falls into the emotion of hypnosis. The idea of sleep is not necessary for the production of hypnosis, but serves as a convenient signal. The specific emotion of hypnosis must be present in order that a person may be hypnotized. If in its place another emotion is produced by the hypnotizer or by the circumstances attending the act of hypnotization, *e. g.*, fear, excitement, expectation, then no hypnosis will follow, *and this is why at the first attempt so many hypnoses fail.* Concentration of thought upon a single object, etc., helps by preventing the mind from wandering, and concentrating it involuntarily upon the expectation of the emotion of hypnosis which the patient is waiting for.

SOCIETY MEETING.

THE CLINICAL SOCIETY OF THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

Stated meeting, April 17, 1903. James A. Mitchell, M. D., in the chair.

The Uses of the X-ray and Accessory Measures in the Treatment of Diseases of the Skin. By Dr. William Benham Snow, of which the following is an abstract:

He said that the contraction of protoplasm under the influences of the X-ray was demonstrated by daily observation. If the hand was held for some time before the X-ray tube there would be a sensation of constriction, and the appearance of an ulcerating surface similarly exposed was as if glazed and perceptibly contracted. Tissues of low vitality—tumors—would break down, while the normal tissue would withstand a cutting off of the blood supply for a longer time. The contraction of the arterioles also deprived the skin of its usual blood supply, and after frequent or prolonged exposures the glands and hair follicles became atrophied, which, when not persisted in, was not permanent. In the treatment of skin affections it was not necessary to employ the same intensity of X-raying as in the treatment of deeply-seated malignant

growths. Ordinarily low tubes should be employed, high tubes, because of their unnecessarily great penetrating powers, whereby deeper tissues were affected, being generally contra-indicated. In the treatment of acne, screening was a matter of much importance, because neglect of this precaution might cause the loss of the eyebrows or other disfigurement. In making exposures from the front the nose should be screened. It was a better plan to expose the sides of the face. The plane of the anti-cathode should be relatively parallel to the surface exposed, and at a distance of six or eight inches from a low vacuum tube, or ten to twenty inches from a high vacuum tube. There should be for the first week or ten days an interval of one day between the exposures; after this the treatment should be given twice weekly until a blush indicating a coming dermatitis appears. In the intervals the high-frequency glass electrodes should be applied to the surface for the purpose of restoring the normal circulation to the superficial structures of the skin that there might be no undue paleness of the skin afterward. The brush-discharge produces a roughened condition of the surface if used for a long time. Several cases were reported showing the good results of the treatment. They incidentally illustrated the inadvisability of using the brush-discharge.

The treatment of superfluous hair was conducted, the speaker said, on practically the same lines as for acne. The treatment should be suspended after the hairs disappeared until the hairs reappeared, which would usually be for two or three months. This method should be pursued until there was no longer any return of the hair. The advantage of the method was that there was no scarring, and experience did not indicate that the skin was otherwise unfavorably affected, for the functions of the sweat glands were generally restored after the final cessation of the treatment.

Ulcers of all types were generally healed promptly by the application of the brush-discharge. The rapidity of these results was gratifying. Only the tonic effect of the X-ray should be sought for, it being used only as an adjuvant to the brush-discharge.

Most cases of lupus vulgaris could be cured by the X-ray alone, and it was certainly true that the brush-discharge could also cure some cases; hence it was a valuable adjunct to the X-ray. The violet and ultra-violet light would undoubtedly cure most cases of lupus vulgaris without other means, but it was a slow and expensive method. The X-ray should be used on alternate days for ten or fifteen minutes, using a low vacuum tube at a distance of six or eight inches from the ulcerated surface. The exposures should be made until the ulcerated surface appeared to be breaking down, and then the brush-discharge should be substituted and applied daily until

the effects of the X-ray had subsided or the surface had healed. The effectiveness of the treatment was shown in a case presented at the last meeting of the society, that of a patient who had suffered from the condition for seventeen years.

Lupus erythematosus responded less promptly to this treatment, although the prognosis as to ultimate recovery was about the same. It had been demonstrated that the violet light would cure most of these cases, but the combined employment of the X-ray and the brush-discharge would generally effect a cure in a shorter time. When marginal structures were involved, or when it was on parts in which it was desirable to preserve the hair, the violet light was advantageously substituted.

The treatment of epithelioma was one of the greatest triumphs of the X-ray, and he believed that the percentage of cures would eventually include nearly all of the cases subjected to the treatment. Many of the reported failures were probably due to the persistent and too prolonged use of the X-ray, thus interfering to too great an extent with the processes of nutrition. The application of the brush-discharge should be deferred until the beginning of the breaking-down process. Eight cases of epithelioma were reported by Dr. Snow, in which the treatment had proved successful. Primary cases of epithelioma were more promptly cured than those which had previously been operated upon, and the same was true of ulcerating surfaces as compared with an epithelioma without ulceration. In the latter class of cases there was great danger of metastasis, and a higher vacuum tube was required.

Discussion.

Dr. Herman Grad: I have watched the treatment of some of the cases reported this evening, and I have listened to this paper with great interest, particularly as the author has classified the various modalities, the use of which he recommends. Lupus will certainly yield more or less readily to the X-ray, the best results being secured by the use of the various modalities in the manner described in the paper. The light treatment is necessarily longer. In the treatment of epithelioma I believe the question of screening is of the greatest importance. For example, in an epithelioma of the lip it is desirable to X-ray the parts as widely as possible, and yet certain adjacent portions, such as the tip of the nose, the lobes of the ears, and the eyebrows must be protected. Another interesting question is, Shall we ray sufficiently to produce a dermatitis? Some have maintained that this was essential, but if this plan be adopted an increased process of absorption is established, and hence we may disseminate the malignant process. In some cases in

which metastasis has occurred the process has been so nearly coincident with the development of the X-ray dermatitis that it is difficult to resist the conclusion that the one was largely dependent upon the other. Surface epitheliomas and skin affections will certainly yield most readily to the X-ray, the Finsen light, and the brush discharge. I believe acne will yield very rapidly to the brush discharge alone, but the process will be decidedly hastened by the use of the X-ray for a few times. We have been taught that acne is a constitutional affection, and yet if this was the case we should not expect it to be cured by the brush discharge. The paper has suggested many interesting and important thoughts.

Dr. Theodore C. Wiggins: With regard to the treatment of acne, I have not used the X-ray at all, but I have had experience with the vacuum tubes. I do not recall a single case of acne in which there has not been constipation, and hence I frequently make use of dilators for the sphincter ani, in addition to the use of the vacuum tube upon the face. The latter is kept up until the face is thoroughly reddened. There will usually be a marked improvement after such treatment, and great benefit will often follow from half a dozen such applications. For this work I have used the high-potential coil with much satisfaction and without the uncomfortable sensations, particularly those experienced in teeth that have been filled, when the static machine is employed.

Dr. Grad: I should like to know how the vacuum tubes were used.

Dr. Wiggins: In using the static machine I usually employ the positive pole, but with the coil there is no difference in the poles, the current I employ being an alternating one.

Dr. James A. Mitchell: I have been observing Dr. Snow's work in this field very closely, and I am prepared to say that some of the results he has secured are little short of marvelous. Most of the cases spoken of this evening I have followed throughout the treatment. The paper is a very valuable one, and presents the cream of his very large experience and indefatigable investigation.

The X-ray the Finsen light, and the brush discharge can no longer be said to be in an experimental stage. The Finsen light is not readily employed in many physicians' offices, but the X-ray and the brush discharge are quite within the grasp of the practitioner. Unfortunately a great many medical men are of the opinion that all that they have to do is to buy a static machine and an X-ray tube and go to work. This is bound to do the X-ray treatment a vast deal of harm, just as has been done in the past in connection with galvanic treatment. The ignorant use of the treatment is also dangerous, and is likely to leave the physician so employing it with a lawsuit on his hands.

Dr. W. Smith: I was much interested in the allusion made to the risk of increasing metastasis by X-ray treatment. In connection with the breaking down of the tissue, auto-intoxication occurs. Now, what shall we do? Shall we cease treatment or modify it in some way?

Dr. Snow: The first speaker referred to a possible causation of metastasis. This opinion has been held by many, although I have grave doubt of its correctness. I have had under observation cases in which the tumorous mass was breaking down for months, and the patient was constantly suffering from auto-infection. The body temperature would vary from 101° to 103° F. for days at a time, and yet metastasis did not occur. I wish, therefore, to insist that I do not believe that auto-infection produces metastasis, although there can be no doubt that metastasis occurs coincidentally with the X-ray treatment. Relatively few cases, for instance, of cancer of the breast are referred to the radiotherapist before they have been subjected to surgical treatment, have recurred, and are on the verge of metastasis. If a female breast is the seat of cancer and no glands are enlarged, why should any of these glands be removed when they will act as means of preventing metastasis or holding it in check in case of recurrence? I believe the removal of the glands in these cases is contra-indicated, and that ten years from now such treatment will be looked upon generally as a bad practice. I am strongly of the opinion that the removal of the glands removes nature's barrier to metastasis. Most of the glands which are enlarged become normal under X-ray treatment. No cases of cancer should be subjected to operation until the X-ray treatment has been employed for at least four weeks. This is long enough to localize the tumor and prevent infection and metastasis. I have ceased to be timid about dermatitis, as the breaking down of the normal tissue can be prevented by allowing suitable periods of rest. I believe the whole solution of the problem is that we destroy the diseased tissue by starvation—the cutting off of the blood supply. I heartily indorse what one of the speakers said about the value of the vacuum tubes, and commend him for his liberality in the selection of various methods. One of the most trying ordeals of the physician using the X-ray treatment is to determine when to stop and when to resume the treatment.

Demonstration of the Violet Light and High-Frequency Apparatus.

A representative of the Kny-Scherer Company exhibited a small iron electrode arc lamp which uses only from five to twelve amperes of current.

Dr. Snow: I have seen some remarkably good therapeutic results from the use of apparatus having glass lenses, and

which were, therefore, opaque to the true ultra-violet light; hence, it is hard to say just what portion of the light is responsible for the therapeutic effect.

Dr. John Branth presented a new X-ray tube with an adjustable vacuum. The disk is welded to a piece of nickel and will stand a very high temperature. He has seen the disk heated to a cherry-red heat for three-quarters of an hour. By changing the conducting wire from one terminal to a special one the disk is heated and the vacuum in the tube increased. The tube can be made instantly lower again by a momentary touch of the conducting wire with another special terminal.

ANNOUNCEMENT.

Dr. Albert C. Geyser will read an article at the next meeting of the Clinical Society on Mechanical Vibration, as Applied to Therapeutics; and a paper on *The Vis Medicatrix Naturæ*, by Maurice F. Pilgrim, M. D., to be followed by general discussion.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

COMBINATION RECTAL ELECTRODE.

The electrode shown in Figs. 1, 2, and 3 are designed for the treatment of various rectal and other pelvic conditions. The part shown in Fig. A. is of vulcanite and may be screwed



into the base for the purpose of preventing contraction of the anal muscle when desired, and is provided with a hole to receive either of the electrode terminals.

Fig. 1 is a terminal adapted to the treatment of prostatitis

and usually employed with the insulated portion A. screwed in position.

Fig. 2 represents the electrode for treatment of constipation. It is larger than the others and is screwed into the base without the insulated plug in order to overcome a spasmodic condition of the anal muscle so often present in such cases.

Fig. 3 is for the treatment of dysmenorrhea or cases of prostatitis to which it may be better adapted than Fig. 1. It may or may not be employed with the movable insulated portions shown in Fig. A. The set are manufactured by Van Houten & Ten Broeck, 300 Fourth Ave., New York. Price \$5.00 net.

X-RAY SHIELDS.

The cuts shown in Figs. 4 and 5 represent two screens employed for general use with the therapeutic applications of the X-ray. They are made of a composition packing which does

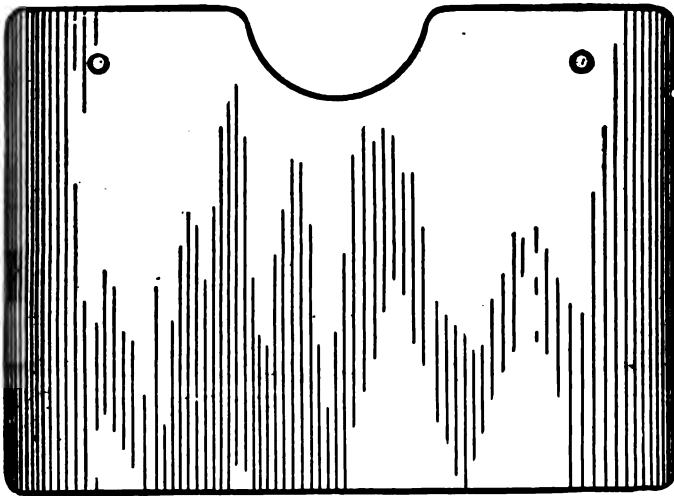


Fig. 4.

not transmit enough of the X-rays to affect the tissues. The designs shown are practical and meet different requirements.

Fig. 4 may be used suspended in front of the face for protection when raying the breast or body of the patient, or may

be placed about the neck or over the shoulders when raying the face.

Fig. 5 is used for raying over the perineum or for shielding the abdomen when raying over the pelvic outlet. These shields

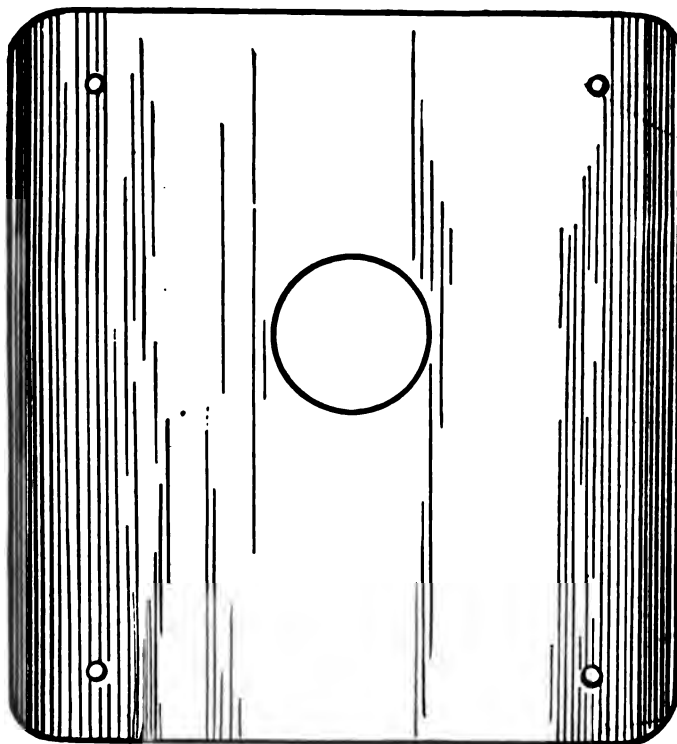


Fig. 5.

may be laid variously upon the person for shielding tissues adjacent to a malignant growth or preventing discharge from the connection cords or terminals of the X-ray tubes. These shields are made by the Jerome Kidder Co., Bible House, New York City.

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SOME OBSTACLES TO THE PROGRESS OF ELECTRO-THERAPEUTICS.*

BY CHARLES O. FILES, M. D., PORTLAND, ME.

Only a few years ago the use of electricity and magnetism in the treatment of disease was almost entirely confined to more or less ignorant men and women, wholly outside of the medical profession. We may yet see relics of this condition in the advertisements of electric belts, the electropoise, and other more or less worthless contrivances, with the startling headline, "Electricity is Life." The use of electricity for therapeutic purposes from the very beginning of the Era of Franklinic Electricity has been discouraged by regular physicians. Referring to the Rev. John Wesley's book, "The Desideratum; or, Electricity Made Plain and Useful by a Lover of Mankind and of Common Sense," published in 1759, Beard and Rockwell (page 200) say, "From the tone of the book it is clear that the Faculty, as Wesley calls the profession, were disposed to despise electro-therapeutics and to reject its claims, as they have ever since, until within a few years, and consequently they suffered what was really valuable in medicine to be monopolized by the laity." There were fairly good reasons for this neglect, although those reasons do not now hold good. The medical profession has always been conservative, and this conservatism has been a very useful and proper safeguard of the lives and health of the community. There has always been a fear and dread of anything that was mysterious, not only among physicians, but by all mankind. What could be more dreadful than to think of using as medicine, the same fluid that causes the terrific thunder and the blinding flashes of light that have brought death and destruction to property and persons within

* Read at the Annual Meeting of the American Electro-Therapeutic Association, at the Hotel Kaaterskill, September 3, 1902.

our own observation and knowledge? Even at the present day, the nature of this fluid is practically unknown. Professor Trowbridge, in his book on "What is Electricity?" in summing up the whole subject, asks and leaves unanswered the question "Must we answer, *ignoramus et ignorabimus?*" If then to-day the scientist knows so little of the substance of electricity, we can scarcely blame the physicians for holding somewhat aloof from it. On the other hand, our acquaintance with its practical uses has been of such long standing that we ought not to have the same fear that our ancestors had of it. We have harnessed it for doing the world's work, just as we harnessed steam, and there is no more harm or danger from it than from steam.

Since 1731 we have had the Franklinic current; since 1791, the galvanic current. Since 1809 we have had the electric light. Since 1831 we have had the Faradic current and the principle which made possible the electric motor and dynamo, although these later forms did not come into actual use for thirty or forty years after Professor Faraday had announced his discovery. At the present time the every day life of the great mass of the inhabitants of all civilized countries is touched on every side by electric devices intended to do our work and help us in our pleasures. Within the memory of most of those here present, the telegraph, the telephone, the phonograph, the electric motor, the X-ray, and the electric light produced from the dynamo, have come to be as common as the use of steam. It would now be the height of absurdity for the medical profession to stand aloof and refuse to accept the benefits to be derived from the scientific use of electricity in the treatment of disease on the score of ignorance of its nature and powers. We have been glad to hail the many inventions and discoveries that have been of assistance to us in the business of life. Now let us be equally glad for the accomplishment and promises of this wonderful fluid in the treatment of disease.

It is a fact that the great majority of educated physicians even in the present advanced state of knowledge on this subject, are ignorant of the elementary principles of electricity as applied to medicine. Probably 90 per cent. of the physicians of the country do not even know the difference between the galvanic and the faradic currents, to say nothing of the purposes to which they are applied. If you ask the average physician

if he has used the galvanic current in a certain case, he will very likely reply in the affirmative. Ask him further whether the electricity he used made a buzzing noise, and he will probably tell you that it did, showing his absolute ignorance of the difference between the two currents. When a physician has mastered the difference between these currents he will usually be found to be quite ignorant of the proper uses to be made of the two poles. It is a very common experience for a patient to ask his physician, who knows absolutely nothing about electricity, if he thinks electricity will do him any good, and the learned man may generally be relied upon to answer emphatically in the negative. The opinion of a man, whether he be a physician or a layman, on a subject with which he is entirely unacquainted can be of very little value. If that is not the essence of quackery and charlatanism, then there are no such things as quackery and charlatanism. Some physicians will so far condescend as to say that electricity may give some relief, but that the relief will only be temporary—that it cannot possibly cure disease. This same physician would never think of saying to a patient whom he was treating for a cold or an acute attack of indigestion that his medicine would only give temporary relief, and the patient would be liable to a recurrence of the same trouble under the same circumstances that caused the first attack, although the statement would be perfectly true. One of our most noted surgeons, who was somewhat interested in Apostoli's treatment for uterine fibroids, asked a physician who was very well learned in the medical uses of electricity if he could not use his *faradic battery* to accomplish the same result. The ignorance of physicians in general respecting the medical uses of electricity is simply appalling, and is as unnecessary as it is dense. Our leading medical journals for years have been publishing, in nearly every issue, facts that are both interesting and instructive in relation to this subject. Text-books in large numbers have been published on this subject by some of our ablest and most conservative men. These journals and books are readily within the reach of every physician.

A great obstacle to the study of electro-therapeutics by physicians has been the unnecessarily atrocious terminology and obscure definitions at the very threshold of the study of the science. An example of this may be found in the definition of "ampere," in a work intended for beginners in electro-thera-

peutics, written by Dr. Bigelow. Here it is: "This is the Ampere, and is equal to 10⁹ unit C. G. S. It is a current of intensity equal to one C.G.S. unit when traversing a circuit of one centimeter of length rolled in the arc of a circle whose radius is one centimeter; it exercises a force of one dyne upon a magnetic pole of one unit of intensity placed at its center."

Such definitions as this are enough to deter any but the most valorous from pursuing the subject further. In more recent works, however, much of this purely technical language is cut out or greatly modified. The series of text-books published by the International Correspondence School at Scranton, Pa., are of such a nature that any intelligent person of fair attainments can easily comprehend and master them; while, at the same time, the subject is treated in a very thorough and scientific manner.

It is a great misfortune that our colleges of medicine have as yet been unable to give courses of instruction in electro-therapeutics in their curriculum. It should be our business to endeavor to see that this mistake is rectified at an early date. The medical journals, as a rule, have been very willing to publish articles on this subject, as well as reports of cases treated by electricity.

The introduction of asepsis in surgery and gynecology gave such an impetus to these branches of medicine that for the past twenty or thirty years they have almost wholly dominated the profession. If a patient has a pain, it is now good practice to cut for it, and thus try to remove it. Even recurrent attacks of indigestion in women are sometimes imputed to disease of the pelvic organs, and laparotomy is suggested as the only proper or effective means of cure. If the patient happens to die, the cause of death is usually assigned to some obscure but necessarily fatal disease of the pelvic organs. The mutilation of women by spaying for every conceivable pain and ache has gone so far that protests from reasonable and thinking physicians have been everywhere published within the last few years in our best medical journals, calling for a halt in this lust for operative surgery. We have all seen the mutilated, unhappy wrecks of beings who were once women, but who, for the glory and profit of the operator, are now in far worse condition than simple disease could have left them. There are cases undoubtedly where those operations must be made to save life, but they

assuredly ought not to be made for the sole purpose of preventing conception. Surgery, in its best aspects, will be helped rather than hindered, by the addition of electricity to its armamentarium.

No one of us knows any too much about electricity, although an outsider, listening to some of our discussions, might well think that some of our most learned members (who, at the same time, are among our very best fellows) knew the whole business, and that the last word had been spoken to the universe on the subject of electric energy, and had been confided *exclusively* to them.

Another serious obstacle to the progress of electro-therapeutics is to be found in the desire and hope of immediate cure—an almost miraculous cure—and this idea is encouraged by many members of the profession, with the evident purpose of bringing this specialty into disrepute with the general public. Many of the cases best suited to treatment by electricity are chronic in their nature, and it is only fair to realize that their successful treatment, under the most favorable circumstances and methods, must necessarily require considerable time. This condition can only be improved by an increase of knowledge on the part of the general public from whom our patients must come.

Physicians who are using electricity ought to explain pointedly and clearly to their patients at the very outset that a length of time must be given to treatment that shall bear a fair proportion to the duration of the illness. Patients ought to be given clearly to understand that in using electricity as a curative agent, we do not claim for it magical or supernatural powers, but only its superiority in the treatment of many diseases over other remedial agents, when scientifically applied. The success of treatment by electricity depends in most cases, upon equalizing and stimulating the circulation, and so improving the nutrition of the affected part or parts, or in its sedative effects upon the nervous system. It is obvious, therefore, that such results can only be expected as a result of treatment extending over a more or less considerable period of time.

Patients are very much inclined to “dabble” with electrical treatment. They expect too much from the first treatments. If the first two or three treatments do not effect a cure of a disease of a month's or year's duration, the patient is very apt

to drop out and be lost sight of. On the other hand, if the results are marked from the very first, the patient, in his exuberance of joy, imagining himself cured when the process of cure has only begun, likewise fails to return for further treatment. Thus it is that electro-therapy is impaled alike upon the horns of pessimism and optimism. It is not given a fair chance in either of these groups of cases. The majority of our patients, it is to be apprehended, fall into one or the other of these divisions. It is very hurtful to electro-therapeutics, and very unjust. The desideratum to be attained is to keep the patient "at it," so to speak, until electricity has had a chance to disclose its capabilities in a given case. How can we accomplish this and still keep within ethical limits? A celebrated otologist, living not very far from here, has been in the habit of exacting, from every new patient whom he did not feel personally sure of, a fee in advance, say, for twenty treatments. He does not care so much for the money; in fact, he is indifferent to that important consideration, but feels that that is the only way he can keep his patients in line and secure a fair showing for his treatment. If people have paid for something in advance they may generally be relied upon to continue treatment at least during the period for which they have paid. The aurist to whom reference is made has found in the majority of his cases that before half the treatments are taken his patients begin to realize benefit therefrom, and enthusiastically continue them. He is thus enabled to better serve his patients, as well as the science of otology; whereas, left to themselves, the majority of those patients would very likely, after the first two or three treatments, have fallen by the way-side. It is to be regretted that electro-therapeutists could not have adopted a similar course of procedure with the "floating" portion, so to speak, of our clientèle.

The influence of the profession at large may usually be counted against the use of electricity by specialists. This, of course, is very much greater in some localities than in others, but is altogether too great in all places. Such a state of affairs can only be improved by an earnest and united effort on the part of those who are working in electro-therapeutics, to educate both the profession and the laity to a better understanding of the subject.

As has already been partially referred to in this paper, another

serious obstacle to the progress of electro-therapeutics is the unskilled manner in which electricity is administered even by those who profess to believe in its curative properties. As illustrative of this fact, mention may very appropriately here be made of a certain former member of this Association, who, at one of its annual meetings, read a paper wherein he radically misconceived the differential uses of the positive and negative currents. Upon being sharply criticised therefor, he promptly resigned from membership in the Association. Without knowing it to be positively a fact, it is quite safe to assume that this gentleman's influence has ever since operated as "an obstacle" to the progress of electro-therapeutics in the community where he resides.

Success is oftentimes as dangerous to the future well-being of an individual or a cause as temporary failure. It may well be questioned whether the rapid strides which have been made in electro-therapeutics in recent times, especially in the treatment of malignant disease by the use of the X-ray, may not result in a great deal of harm to this branch of medicine.

The eagerness of the manufacturers of static machines and other electrical apparatus to find customers for their goods, is likely to result, if it has not already done so, in the production of an embryonic lot of electro-therapeutists who, with insufficient knowledge, will take up electricity for "purposes of revenue only." This is, indeed, a most serious menace, but it is a condition that we are powerless to help at the present time. The only method which is likely to overcome this undesirable condition of affairs ultimately, is by our assisting those physicians who are interested in the subject of electro-therapeutics, if we find that they are earnest, capable, and adapted to the work.

One of the greatest obstacles to the progress of our specialty yet remains to be noticed. The medical laws of the various States offer no restraint whatever to those who treat disease by electricity, so long as they do not publicly claim the title of physician or prescribe drugs. They are thus permitted to enjoy the privileges of a registered physician who practices electro-therapeutics exclusively, without any requirements being exacted of them. This is invidious and unjust, and amounts to class legislation. A physician in regular standing who may desire to remove from one State to another for any sufficient reason, with a view to practicing electro-therapeutics, for instance,

must first appear before a State examining board and stand the ordeal of a severe examination on seven or eight of the elementary branches of medical science. If he succeeds in passing the examination, he is quite likely to have as a competitor (?) for public favor, a "Professor of Electricity," or a "Medical Electrician," who has never passed an examination in the writing or speaking of his native tongue, or anything else. And still more unjust and invidious is the fact that men who studied medicine and graduated twenty or thirty years ago, when only two courses of lectures were required, cannot now, under the laws of some of the States (particularly in New Jersey) *even get an opportunity to appear before the board for examination!* It cannot be otherwise than that much harm, not only to electro-therapeutics, but to the general public as well, must result from this unwise passive permission to untrained and unskilled persons to do what we of the regular profession, who are responsible and answerable to the community, would not be permitted to do, except after due registration, if not examination, under the pains and penalties of the law.

In concluding this paper, a brief consideration of the remedy for the difficulties already pointed out becomes very important. One remedy, general in its character, would seem to be all that the foregoing obstacles really require for their eventual removal. I need scarcely say that that remedy is a general diffusion of knowledge among physicians and laymen relative to the curative properties of the electric current. It becomes especially important for us to see to it that misinformation is not disseminated among the people. We should, as a body of electro-theraputists, see that gross misstatements as to the uses of medical electricity shall not go unchallenged or uncontradicted, even when made in the non-medical press. At the same time, it behooves us who are using electricity more or less as a specialty to be careful not to make exaggerated claims as to what can be accomplished by its use. It would be better for us, and better for the specialty, to understate rather than overstate, possibilities, or even probabilities. We must see to it that electricity does not become "wounded in the house of its friends."

We must especially guard against the tendency towards narrowness or sectarianism, which is a danger that besets every person who confines his work to a certain line. We must not permit our enthusiasm to lead us into the blind belief that elec-

tricity will alone, and of itself, cure all the diseases to which human flesh is heir. There is a tendency on the part of the teachers of *materia medica*, and the younger practitioners of medicine, to believe that drugs will accomplish everything that is required in the practice of the healing art. There is also a tendency among the surgeons to believe that surgery—the use of the knife—is indicated in the great majority of diseases that do not readily yield to medicine. We, as electro-therapeutists, must not be hampered by a belief in a single or exclusive method of treatment, even though it be that form of which we all think so favorably—treatment by electricity. On the contrary, let us be catholic and conservative, employing whatever agent seems to promise the most benefit to our patients, whether it be drugs, suggestion, or surgical procedure, or, best of all, electricity—the latest and best specialty in our profession.



THE X-RAY AS A THERAPEUTIC AGENT.*

BY JOHN W. DANIEL, M. D., SAVANNAH, GA.

In presenting this paper, I wish to first announce some conclusions that I have arrived at, after two years use of the X-ray as a therapeutic agent.

In the X-ray we have an agent that will rival vaccination and antitoxine, and one whose possibilities have not as yet been thought of.

In taking patients for X-ray treatment the operator should always examine them himself, and not take the word of any other physician as to the extent and nature of the growth, for often a patient with a superficial cancer will also have an involvement of some remote or adjacent organ.

My observation has been that women respond more quickly and make better recoveries than men.

In undertaking the treatment of a cancer of the mammary gland always examine the patient closely for involvements of the lymphatics, liver, pelvic viscera, and stomach. If there is the least suspicion, be candid and state the condition to the patient and family, thereby relieving yourself of any embarrassment in the future by your patient's dying from some growth other than the one being treated.

There is great danger of metastasis, so inform the patient of the risk. This danger is to be encountered more in carcinomas than in epithelioma. The personal equation or idiosyncrasy enters into burns as much as the over-exposure. Patients that are very susceptible to the sun's rays will also prove susceptible to the X-ray.

Too rapid absorption or too much treatment will produce an intoxication, from which the patient recovers slowly, if at all, so the first evidence of an intoxication should be taken as a warning to suspend treatment. The stopping of treatment does no harm, and is often of benefit, as the healing process continues once it is established.

Patients presenting cancer of the mammary, or any carcinomatous growth, are more readily influenced by the absorption of pathological products than patients with open sores or skin cancers. Age is another factor and has considerable weight.

* Read before the Georgia State Medical Society, 1903.

All patients should have their urine examined previous to treatment, as often a rapid absorption of changed products will cause a suppression of urine in a case of albuminuria. The urine should be examined often during treatment, and if there is an appearance of albumin in a previously normal urine, suspend treatment until the urine clears up, otherwise the patient might die with uræmia.

The viscera of the body should be examined also during the course of treatment as well as at the beginning. Always be on the look out for metastasis. The patient's weight should also be watched, for a loss of weight might indicate one of several things—extension of growth, involvement of other foci, involvement of kidneys or too rapid absorption causing an intoxication. If there is a loss of weight, try to find the cause and apply the remedy. If it is an extension of the growth, apply the ray more vigorously; if a new focus of infection, apply the ray to it; if an intoxication, stop treatment and give tonics, if the kidneys, stop treatment and give diaphoretics.

Another factor of great importance in the prognosis is the previous treatment. If there has been surgical interference, or application of arsenious plasters the case is complicated and the prognosis is not so good as in a case that is in its original condition.

Also the general physical condition must be taken into consideration—anæmia, faulty digestion, anorexia, previous loss of weight, age, extent of growth, with location and length of time growth has existed make up the sum total on which to base a prognosis.

Apparatus.—As to choice of apparatus, there is little difference between the static machine and the coil. Each has its advantages, and also its disadvantages. The coil when run on a 500-volt, or alternating circuits, is always ready for work, independent of the humidity, but in some way seems to produce a quicker and more severe burn than the static.

The static machine has its principal disadvantage in that it depends, to a great extent, on the humidity as to its number of work days. Its advantage is that it can be run by hand-power as well as by a motor, thus being within the reach of the country practitioner as well as the city physician. Another disadvantage is that it is fixed in its place of operation, while a coil with storage batteries can be carried to the bed-side.

This is of minor importance in the treatment of cancers, but is an advantage in the treatment of nervous diseases.

As to tubes, the only tube to be used in therapeutics is the regulating type. With this type a patient always gets the same exposure and by timing the exposure the susceptibility to burns can be regulated to some extent. In treating growths of the mouth, throat, vagina, rectum, etc., the Crandall tube is a great addition. It is superior to any other tube, in that it enables the ray to be put in direct contact with the



Case 1.

growth, lessening the time and insuring the certainty of the exposure.

In the effort to eliminate the burning effects of the ray there are several methods employed. One is to use a mask of tin foil and blotting paper with a hole in it through which the growth is exposed, another, now spoken highly of, is a mask of celluloid with no opening for direct exposure, still another is a mask of paraffin. Never having employed the last two methods can say nothing of them.

In reporting clinical cases I will first take up those reported at the Georgia State Association last April and briefly give results.

Case No 1. After one year there is no recurrence of the trouble.

Case No. 2. After several months with no increase of the growth, and an apparent improvement, with margins of growth healing over, and everything looking favorable, patient developed a meningitis and died.

Case No. 3. Progressed nicely until mid-summer, when she developed a case of cholera morbus and died in two days.

Case No. 4. Patient is still well and reports no trouble.

Case No. 5. Patient left city in July, returning home, with promise to return in winter and have a skin grafting done if there was no recurrence of growth. I have heard from him several times, and while there is no recurrence, patient seems



Case 3.

so well (and is able to run his farm) that he decided that skin is not necessary for his cure.

Case No. 6. Patient is still in perfect condition. There has been no recurrence of trouble.

Case No. 7. Patient called at my office in December of last year to report that he is now well and has no trouble.

Case No. 8. Patient acquired morphine habit, and as I could not control him nor get regular exposures discontinued treatment. He died in December, 1902.

Case No. 9. Patient continued at work, suffering no pain nor discomfort, but as there was no hope of a cure treatment was discontinued after April, 1902. In January, 1903, patient decided he would try surgery, although he was in no pain and was doing his daily work, so submitted to an operation and died on the table.

Case No. 10. Continued treatment until December, 1902.

There has been no recurrence of pain, and patient's general condition is good. The nodular mass on left cheek has sloughed out, leaving a clean, clear-cut margin, which seems inclined to heal. Condition is worse than when treatment started, and there is no pain. Growth seems to have sloughed



Case 5.

out, and patient's chance for recovery are better than when treatment was started.

Case No. 11. Still under treatment. Growth at angle of mouth is very much improved, but a metastatic growth has developed on ramus of lower right jaw.

Case No. 12. Patient is entirely cured.

Case No. 13. Female, age seventy-six. Epithelioma on face of ten years' standing, about size of silver dollar. After twenty exposures was dismissed as cured. Have received letters since dismissal stating that she has had no recurrence of trouble. Cured eight months.

Case No. 14. Epithelioma of nose and face in female, age sixty-five years. Growth of ten years' standing, and, as you will see from photograph, was quite extensive in area. After two and a half months' treatment with several interruptions, patient has been dismissed as cured, and, as photograph will show, there is considerable reduction in size of mass.

I have found that after a patient has been burned she becomes very susceptible to the ray. In this case the patient was burned in December last, and did not report for treatment again until February 1 of this year, the growth in the meantime having almost disappeared. I gave a few exposures, and each time the skin reacted violently; so discontinued treatment after fourteen exposures. There now remains only a red scar, with a few scabs from burns.

Case No. 15. Female with carcinoma of breast. Had right breast removed in Charleston, S. C., about two years ago for



Case 9.

the same trouble. Came for X-ray treatment in October, 1902. Was treated until December of the same year, when breast was burned quite severely. Treatment was discontinued. February 18, 1903, burn was entirely healed, and upon close examination breast seems perfectly normal, so will give no more exposures.

Case No. 16. Carcinoma of breast, female, age forty-two; growth about size of goose-egg. Was referred to me by her family physician to be treated for cancer of breast. Treatment was started in August, 1902, and continued at irregular intervals until December, 1902, when she developed a burn of slight degree. Treatment was discontinued. In January, 1903,

burn was entirely well, and breast was of normal size and appearance, but patient commenced to complain of pains in region of stomach. The family physician was called in, and I, in turn, as consultant, pronounced the trouble a metastatic carcinoma of the stomach, and the patient in a few weeks died of ex-



Case 10.

haustion. This is an illustration of the warning I have previously given of examining the patients yourself. This patient had been complaining of shooting pains in the epigastric region from the first visit, and I referred her each time to her family physician for advice. There was no intimation to me by him that there was anything wrong. This was, of course, no excuse for me. I should have examined the patient myself, then there would have been a different prognosis given, for the patient and physician both stated that she had been troubled with a stomach disorder for probably a year before the breast gave any trouble; so, in fact, the case was one of metastatic involvement of the breast.

Case No. 17. Female, age fifty-six, carcinoma of the breast, of two years' standing, rapid growth, size about that of a man's head. Gave exposures from July to October 1, when there was no diminution in size, so advised removal of breast, which was done.

In order not to take up too much time of the convention, I

will give a total of the number of cases treated, with general results.

In a total of seven cases of lupus vulgaris, there have been seven cures.

In a total of twenty-five cases of epithelioma, taken as they presented themselves, and not selected for statistical purposes, there have been twelve cures with no recurrence, two deaths



Case 12.

while under treatment, three discontinued treatment after a few days, and seven were very much benefited.

The two that died were cases that were hopeless. One had side of face, from chin to margin of scalp entirely destroyed—lived only three weeks after arriving in the city. The other case was one that involved the pharynx, soft and hard palate and cheeks. Came to me as last resort, with a prognosis of death in less than two weeks. He lived six months, improved, and was able to swallow solid food part of the time during treatment. Died from an acute bowel disorder, probably dependent on the cancer.

One was an osteo-sarcoma, shown in figure. Patient was much benefited, growth arrested and pain relieved, but no absorption of growth was perceptible. Patient also had an albuminuria. Was operated on against my advice and died on the table. While this was counted in the statistics against the treatment, it should be counted in the class improved.

Of the six cases of carcinoma of the breast, four were cured and one was improved, and afterwards operated on at my suggestion, as the growth was entirely too large to hope for complete absorption, and there was great danger of intoxication in making the attempt, so, after a few months' treatment,

the breast was removed, and there has been no recurrence up to the present time.

Two were cancers of the stomach. One was in the last stages when she applied for treatment. After two weeks, treatment was discontinued for a month on account of an accident to my machine. Patient was improved to this extent by



Case 14.

the few exposures—there was a lessening of pain, patient could eat with less discomfort, and had a sense of general bodily improvement. The second was the case complicating the mammary cancer, and has been counted under that head.

Of the seven cases of epithelioma classed as benefited, one came from Johns Hopkins, with prognosis of speedy death, probably within a few months. Was treated from May until August, with three weeks' intermission; went home in August as a hopeless case, although all pain had been relieved and patient was able to swallow solid food, which was not the case when treatment started. Being a case of epithelioma of throat and tongue, and the Crandall tube not being on the market at that time, I was unable to reach the seat of trouble in a satis-

factory way. Patient lived until January of this year, and then died from exhaustion and probably intoxication.

The remaining six cases are still under treatment, with a bad outlook in each case.

In the total number of cases treated, twelve have had surgical interference before applying for treatment. Four of these have



Case 14.

been cured. Two have died, and the remaining six are under treatment, with little hope of a cure.

Surgery seems to be rather a disadvantage in cases of epithelioma, while in carcinoma it is of assistance if the mass is of large size. Removal of the mass lessens the danger of intoxication, and having the bulk of the growth out of the way there is less to overcome in the treatment. This, however, is still a theory. If surgery is resorted to in this class of cases, the X-ray should be carefully applied as soon as the patient is able to undergo the treatment, and not wait until there is a secondary involvement.

102 Henry St., East.

THE THERAPEUTIC USE OF ELECTRICAL CURRENTS OF HIGH POTENTIAL AND FREQUENCY.*

BY J. HOLCOMB BURCH, M. D.

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(Continued.)

There are four methods of employing high-frequency currents. By direct contact, by which metal plates are molded to the affected part and connected with one of the poles of the solenoid, the other pole being attached to a foot plate, hand electrode, or grounded. This application corresponds to the wave-current, and is, I feel assured, from a therapeutic standpoint, identical.

By auto-conduction is meant the placing of the patient within a large solenoid connected with the outer coatings of the two Leyden jars in the same manner as the D'Arsonval instrument. The patient must be so placed as not to touch the spirals of the solenoid. This application corresponds to the static cage, and is without doubt the same current.

Condensation corresponds to the static bath. The patient lies upon a metal couch that is connected with the two poles of the solenoid.

The local applications are similar to the static disruptive and convective discharges. The electrodes are the same as those employed in static work, with the exception of the condensing electrodes to which I have already referred. Of these, the test tube filled with carbon, having a small metal rod through the center, answers every purpose and is much less expensive than the vacuum glass electrodes so much used in this work. Should a vacuum glass electrode be preferred, however, I have found that an ordinary incandescent light bulb attached to a handle answers every purpose, and as those may be utilized having the carbon filament broken, and, therefore, useless for other purposes, they certainly have the advantage of being inexpensive.

The physiological action of high-frequency currents may be considered in relation to their effects upon the nervous system, upon the functions of nutrition, and upon micro-organisms.

* Read before the Syracuse Academy of Medicine, May, 5, 1903.

Upon the central nervous system the effects of high-frequency currents are indeed peculiar. If one were to grasp the two extremities of a solenoid traversed by a high-frequency current no appreciable sensation would be experienced; neither would there be produced the slightest muscular contraction. Yet, the organism would receive, or at least, become charged, with a current of not less than one hundred thousand volts, the alternation of which would be approximately one hundred thousand million per second. This fact has led many investigators to deny the power of these currents to penetrate the integument.

In producing muscular contractions a current of from twenty to thirty excitations per second is necessary. As the number of alternations increases the muscle becomes tetanized up to a rate of vibrations of from 2,500 to 5,000 alternations per second. After this point has been reached tetany becomes less and less marked until no appreciable sensation is experienced. The optic nerve perceives vibrations between 497 billion (red) and 728 billion (violet) per second; but it is blind to the infra red and ultra violet. The same law applies to sound, and, without doubt, to the electrical energy that we are now considering. X-ray radiance is invisible to the eye; yet, it is capable of resolving neoplasms, and while these currents are incapable of exciting the central nervous system, they still possess some subtle power by which organic function may be modified. If a rabbit is placed within a solenoid traversed by a high-frequency current the vessels of the ear become rapidly dilated, being fully as pronounced as were a section of the great sympathetic resorted to. This dilatation is in a short time followed by contraction equally energetic. Upon man the effects are similar. The skin in a short time becomes bathed with profuse perspiration. By placing a mercurial manometer over the carotid artery of a dog there will be a falling of the arterial pressure of several c. c. Potain by means of the sphymograph demonstrated the same results in man. Oudin and Leduc have observed that when a spark is applied to the skin there is produced about the point of application an area of from one to two c. c. of marked amenia, the skin being of a chalky white color that is soon followed by an erythematous redness.

D'Arsonval made an exhaustive series of experiments upon

the action of high-frequency currents on the respiratory organs. He found that the respiratory movements were augmented, and by careful measurement he also found that there was an increased absorption of oxygen and an increased elimination of carbonic acid gas. Upon himself he found that the carbonic acid gas was increased to the amount of from seventeen to thirty-seven liters per hour.

To demonstrate the effects upon combustion D'Arsonval placed within two solenoids two Richard balances, upon which were placed two guinea pigs. One solenoid was excited by a current of high frequency, while the other was used as a control test. In six hours the animal within the solenoid not traversed by the current lost six grams, while the other lost thirty grams within the same period of time.

Tripet made a series of blood examinations at Apostoli's clinic, where he examined a large number of patients affected with various ailments. The examinations were made by means of Hencocque's hemato-spectroscope with the following results: In thirty-seven cases subjected to the action of high-frequency currents the reduction of oxyhemoglobin was greatly augmented. This was more appreciable in cases of malnutrition. In ten cases where before the treatment the reduction had been exaggerated, the employment of these currents retarded the reduction. Six cases were uninfluenced by the treatment.

Charrin made a large number of urinary examinations for the purpose of determining the effects of high-frequency currents. He found that they caused an increase of urea, and that the urine became more toxic. Morton found an exaggeration of urea and a diminution of uric acid.

There has been a great deal of discussion in France in regard to the action of high-frequency currents upon micro-organisms and their toxins. D'Arsonval claimed that many of the toxins, especially diphtheria, could be greatly attenuated by being acted upon by currents from his solenoid. Doumer and Oudin, however, after a long series of experiments, denied the germicidal action of these currents.

From a therapeutic standpoint, the physiological effects of electrical currents of high tension and frequency would seem to indicate their employment in diseases due to errors of nutrition. Both English and French clinicians report cases

of obesity, diabetes, gout, and rheumatism as having been successfully treated by means of these forms of electrical energy.

I have treated one case of diabetes by means of high-frequency and electro-static modalities with no appreciable results. My success in the treatment of rheumatism by these means has been much more satisfactory. During the past year I have employed these methods in the treatment of six cases of articular rheumatism. Four of these cases were sub-acute, two involving the knee, one the ankle, and the other the wrist-joint. Three of these patients received great benefit from the treatment, each of them making rapid recoveries. The fourth was of gonorrheal origin, and was not appreciably benefited. In the two remaining chronic cases one involved the wrist, and the other the knee-joints. Both of these cases responded to the treatment, although a longer time was required to effect a cure than was demanded in the treatment of the sub-acute cases. In treating these cases lead foil was carefully applied to the affected part, and the wave-current used for fifteen minutes. The involved joint was then subjected to the brush-discharge from the glass-covered wooden electrode. By the same method I have treated three cases of rheumatoid arthritis. In two of these cases radiographs revealed a complete destruction of the inter-articular cartilages. The hands in one were involved, there being great deformity. The other was accompanied by ankylosis and deformity of the knee-joint. Treatment was successful in these cases only in relieving pain. After each treatment both patients experienced great relief, that lasted for several hours. In the other case a radiograph demonstrated a beginning destruction of the inter-articular phalangeal articulations with slight deformity. This case entirely recovered. It required ten months, during the first three of which the patient was treated daily, after which she received from two to three treatments per week.

Much has been claimed for these forms of electrical energy in the treatment of pulmonary tuberculosis. Oudin and Dourmer reported seventeen cases, five of which were entirely cured. I have treated in the first year three cases; two incipient, the other presenting complete consolidation of the left apex. The two incipient cases seemed to

improve, although the bacilli did not entirely disappear. The other case made no appreciable improvement. One peculiarity that I observed in these cases was a marked leucocytosis in each case, together with an increase in the percentage of urea. In treating these cases I employed the wave-current, sparks, and the brush-discharge to the affected area.

I have treated two cases of chronic gonorrhea, accompanied by erosions of the urethra, by means of vacuum glass electrodes attached to one of the terminals of a high-frequency apparatus with excellent results.

I was enabled to cure an aggravated case of anal fissure by three applications of the high-frequency current. I used in this case a small test-tube filled with granulated carbon through which ran a wire that was attached to one of the poles of the solenoid, the other being grounded.

In rectal prolapsus I have found the wave-current to be of great value. It is also of particular efficacy in the treatment of seminal vesiculitis. I have treated four cases by this means that received but little benefit from Swinburn's method of stripping. In these cases a metal electrode is employed attached to the positive side of the machine, the spark-gap varying from six to ten inches. This modality is of great value also in the treatment of chronic constipation.

In diseases of the central nervous system or post-hemiplegic paralysis I have found these currents of but little value.

In diseases of the spinal cord they have been found useful in the treatment of locomotor ataxia, muscular atrophy, and in some of the secondary atrophies. I have treated one case of advanced locomotor ataxia with no beneficial result except the relief of pain that certainly was greatly relieved after each treatment. I saw two other cases at Dr. Snow's clinic that had apparently been greatly benefited by the application of the wave-current, sparks, and frictional rubbings. Denoyé reports a case of progressive muscular atrophy as having been cured by the direct application of the high-frequency current.

It is in affections of the peripheral nerves that most may be hoped for from electro-static and high-frequency currents. Their effect upon the various forms of neuritis is almost magical. Relief of pain is generally experienced after each treat-

ment that is usually more or less permanent. The same may be said of myocitis, and the so-called muscular rheumatisms.

Many times very obstinate cases of neuralgia may be cured by means of these currents. My experience has been that the direct application of the high-frequency attachment is preferable in these cases.

In the treatment of the neuroses my experience has led me to expect only fair results from electro-static and high-frequency modalities. In neurasthenia, especially the traumatic variety, insomnia may be relieved, by means of the static bath, wave-current, or the direct application of the high-frequency attachment. Points of spinal tenderness may also be relieved by the spray and brush-discharge. But I doubt if we may expect to greatly modify the underlying psychopathic factors in these cases to any great extent by these currents. I admit that my experience has been very limited and contrary to the teachings of nearly all of the workers in this field. In the treatment of hysteria my experience has been that one neurotic state is substituted for another, and that in the end these patients are prone to attribute all of their misfortunes to the treatments that they have received. The same rule applies to the various psychoses.

If we are to credit the reports of Oudin and Piffard dermatology offers a most fertile field for the employment of currents of high frequency. My own experience is limited to three cases of eczema that were rapidly cured by the discharge from a high-frequency condensing electrode. By the same method two cases of indolent ulcers were rapidly healed.

Sprains may also be quickly relieved by the application of the spray or brush-discharge.

In conclusion, while this field of research is intensely fascinating we must not lose sight of the fact that it is but one of nature's remedial agents, and hold ourselves by our good common sense from being allured into the endless entanglement of speculative enthusiasm.

THE TREATMENT OF HABITUAL CONSTIPATION
BY EXERCISE.*

BY WATSON L. SAVAGE, M. D., NEW YORK.

It is generally conceded by most of us that this is one of the most common of all ailments, the simplest to treat symptomatically and acutely, at the same time it is equally difficult to cure by medicine. In my treatment, some will probably claim that the benefit obtained was not from exercise (the basis of my treatment), but one or the other of the physical agents used, and if we can decide upon the best method of treating this trouble our evening will have been well spent.

Dr. Cohn has given the definition of constipation as a condition of irregular, abnormally rare, or insufficient evacuation of the bowels. This seems so clearly and concisely stated that further explanation is unnecessary. There may be considered to be two classes of causes. The first is due to an independent condition and the second is due to external causes such as mechanical obstructions and strictures. Under this head would come uterine flexions, pregnant women, cicatrices from operation or injury, etc., which have not to be considered in the present method of treatment until after the same is corrected by other procedures.

To return to the first class, namely, independent conditions, we find as (1) the most common causes *inheritance*, as predisposing, not, I believe a necessity, but to it is added the ignorance which brought about the parent's condition visited upon the child, who thus becomes saddled with this trouble before the importance of regularity in evacuating the bowels is appreciated.

(2) Habit. Irregularity of attending to this important function and failure to attend to the calls of nature, leading to an over-distended condition of the intestines and a dulling of the nerves of sensation which give the warning of fullness.

(3) Diet composed of too concentrated foods, and too little fluid.

(4) Lack of sufficient exercise to keep up a healthy muscular

* Read before the Clinical Society of the New York School of Physical Therapeutics on May 17, 1903.

tone and blood supply to the intestines, due to sedentary and lazy habits, weakened abdominal muscles, again in turn due to the same cause, child-bearing, faulty manner of dress, torpidity of the liver, obesity, old age, etc.

(5) Mental conditions, worry, anxiety, grief, close mental study, etc.

The diagnosis of constipation is usually made for us, or it is brought out in a train of subjective symptoms in cross-examination. And while it is generally considered a symptom of some more serious manifestation, such as dyspepsia, neurasthenia, etc., I believe it is very often an important factor in the disease, at least as a contributory cause. We then come immediately to the *treatment*, and it is not my purpose to review the many and varied methods familiar to you all, but explain the practice I have followed for the last fifteen years, and so satisfactory has it been that I have had very little occasion to make any material modification. While I have followed this method many years, it is my belief that it has some originality, and has not been previously placed before the profession, hence my excuse and apology for offering this very commonplace subject for your consideration.

It would be contrary to all laws of practice in treating any condition not to remove, as far as possible, the cause; it will, therefore, be necessary in the case in hand. *Habit*; first and foremost, it is imperative to establish a regular time for soliciting the bowels, and this should be at a time which can most regularly be attended to. Preferably the time when the patient most often accomplishes a good result, and this time is generally in the morning within an hour after rising. This time should not be by the clock, but rather relative to some regular act of life, such as rising, a meal, after a walk, upon reaching the office, before going to bed, etc.

The time fixed, there must be no deviation of more than an hour from it for any cause, if possible to be avoided. Inclinations or calls at other times must not be obeyed, or several days will be lost in effecting regularity and the difficulty made greater.

The *diet* must be made liberal and varied with plain food not highly seasoned, fruit and vegetables composing a goodly part; eaten slowly and well masticated, with little fluid at meals and a good deal between.

Drink at least a full glass of water before retiring and a half hour before breakfast. If followed faithfully, this would correct many mild cases, but it remains for exercise to make a complete and permanent cure. All authorities upon this subject prescribe in a general way exercise, but mostly all fail to specify any special form of movement. It has been my good fortune, if I may so express it, or perhaps privilege, to make numerous observations upon patients acting under general direction in this way. At the Institute we have numerous classes for both sexes and all ages, to which physicians constantly send such cases, and often with the advice that they need no special treatment or care, but require exercise. In these classes the pupils get a very general and more or less vigorous hour's work of a well-planned lesson, which shall take in the entire muscular system, having as its object the bringing about of a very general toning up of the entire system, not neglecting the vital organs. After giving this work a very fair trial of one or two months they frequently report their condition and disappointment whereupon they are at once given the general advice as to habit, diet, etc., as set forth above and continue exercise as before, still without satisfactory result. Then they are taken from the class, put under individual instruction with special exercise and in almost every instance corrected within six weeks. I have many times seen the bowels operate regularly from the first treatment. A case in print is Miss L., sixteen years of age, irregular from childhood and the condition considered hereditary, as her mother had been a constant sufferer since the birth of her first child, an older daughter. This girl was first treated by me for scoliosis, some two years before having been discharged cured and permitted to join a regular class in which she became the most athletic girl of a class of fifty. At this time, the mother came in to see her daughter and in conversation with a patient, Miss B., whom I had recently cured of constipation, learned for the first time that we treated such cases by exercise. She at once reported her daughter's trouble, and I advised her to the best of my ability without result and finally took her from the class and made a complete cure in one month's treatment. The mother afterwards went through the same course and in two months was discharged cured. The latter was much more difficult and slow owing to the fact that she could not come for treatment oftener than upon alternate days and even then often missed her treatments. The case, Miss B., referred to above, was another of much the same character, a young lady music teacher of twenty-two in the general class without relief, when taken individually, corrected at once and discharged cured in one month.

In both class and individual, we follow much the same general order and variety of work beginning with a general, a respiratory, a hanging, a balance, a shoulder blade, an abdom-

inal, a lateral trunk, a slow leg, a game and respiratory, having in mind the general upbuilding of the entire system. The difference being a greater predominance and variety of abdominal, lateral, trunk and slow leg together with change of position, standing, lying upon back, side and abdomen, sitting and complete inversion either by hanging by knees, standing upon head or lying upon an inclined board with head lower than the hips, the object being to mechanically change the contents of the intestines as well as the functions of the same, thereby stimulating peristalsis. All through the varied work trunk-bendings, twistings, and rollings are accentuated. Finally, leg circles, I believe, to have a very direct effect in restoring to normal tone and sensibility the lower rectum and sphincters. This seems to be the only one of all the exercises given to the individual that is not and for obvious reasons cannot be given to the class, although the exact form of many of the others and the relative amount are different and are important factors which must exert their influence.

Another factor of great importance is the change from two and three exercises per day to daily treatment. I have found it very important that special exercises shall be taken daily if not under direction at least at home upon the off days. The exercises of special importance employed are as follows:

(1) Standing position and lifting the abdominal wall up. With a little practice one can learn to give the abdomen a complete roll. (2) Side bending on one side or the other. Fig 1. (3) Knee hanging from ladder (Fig. 2). (4) A side bending and twisting movement consisting in bending down, for example, so that the left hand touches the floor, the right arm being extended upward and the face looking upward to the ceiling and *vice versa* (Fig. 3). This is a very important means of producing massage of the liver. (5) Twisting the body from side to side, holding the hips firm and extending the arms (Fig. 4). (6) Sitting on a table with the knees grasping the sides and the hips fixed and rolling the body around in a circle. This can also be done standing (Fig. 1). (7) Lifting the thighs flexed, gradually extending them until in full extension (Fig. 5). (8) While lying down raising up the feet together in full extension (Fig. 6). (9) Flexing the knees upward and pressing them firmly against the abdomen. (10) Circle movements performed by the left and right lower extremities (Fig. 10). (11) The same movement executed well behind the body. This can be done with the body thrown forward and the hands resting against the wall. (12) Forms of running; (a) simple light running on the toes (Fig. 7); (b) running with the feet kept behind the center of the body; (c) running with the feet thrown to the side, and (d) running with the knees brought up well upon the abdomen (Fig. 8). (13) Lying upon the table, raise the body, touch the toes and return (Fig. 9). (14)

Lying upon the back, circle single (Fig. 10). (15) Lying upon the side, circle single (Fig. 11). (16) Lying upon the face, circle single. (17) Standing, circle legs. (18) Lying, raise



Fig. 1. Legs & hips firm + sides -
bend forward + back -
ward from right to left.

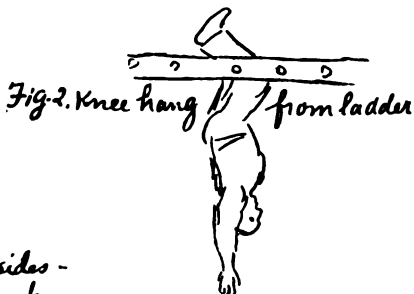


Fig. 2. Knee hang from ladder

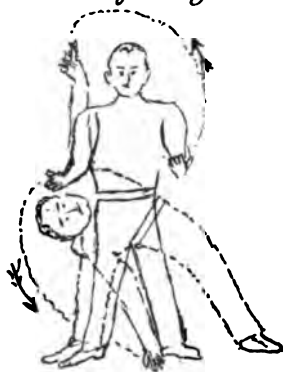


Fig. 3. Liver squeeze



Fig. 4. Body twisting



Fig. 5. Legs flex on thigh

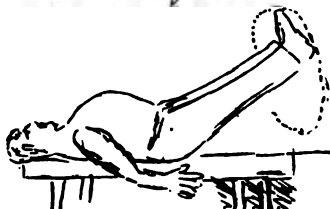


Fig. 6. Both legs circling

body from table and return slowly (Fig. 12). (19) Lying, incline downward, circle legs, flex and extend the same; head low. (20) Knee chest position (Fig. 14). (21) Abdominal breathing (Fig. 15).

We very strongly favor exercises, such as inversion of the body, turning in ring swings or rolls upon the mat. Incidentally, I have never known a tumbler to be constipated. More-

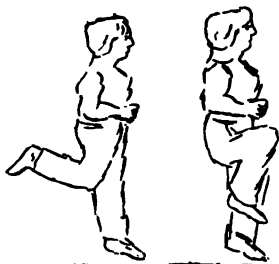


Fig. 7 Easy run Fig. 8 Knee high run

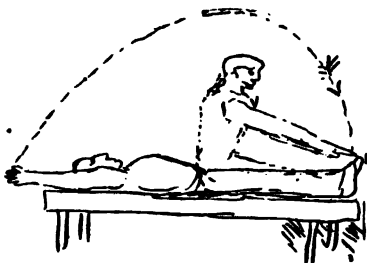


Fig. 9, Raise from Table & Touch Toes & return



Fig. 10 Raise foot backward

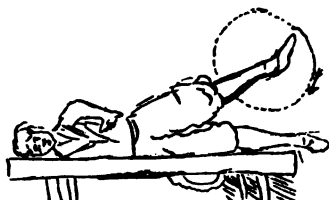


Fig. 11, Raise foot sidewise



Fig. 12 Raise from Table & return slowly

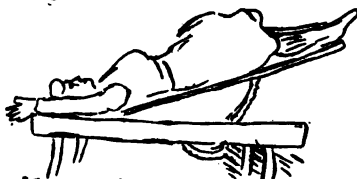


Fig. 13. Incline backward head low



Fig. 14, Knee Chest position

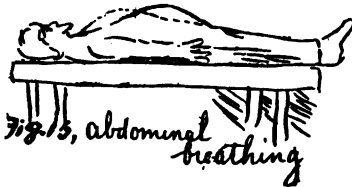


Fig. 15, Abdominal breathing

over, as an exercise in itself the bowels should be solicited at a certain convenient time regularly, and this might be repeated any time within an hour. If this did not succeed, the effort should not be repeated until the same time the next day. If the bowels again failed to move, a glycerine suppository should be given. If this also failed, a full injection of soap and water

should be administered. Medicine was not resorted to except in very extreme cases, and then at the beginning. I always felt that when medicine had to be given for any cause whatever, the desired cure was delayed. By the treatment outlined a cure is almost certain, but afterward a regular habit must be kept up.

In looking over some records of old cases, I find this most interesting record showing a different and more difficult problem.

Miss B., patient of Dr. Meyer, chronic constipation, bowels never moved without medicine, had tried everything but had only been temporarily benefited by skating and on this account was sent to the gymnasium. First week no result whatever not even with the aid of suppository and enema. Second week suppository was effectual and occasional movement without aid. Third week bowels moderately regular but passing a quantity of mucous with each stool for some days, then there was a relapse of nine days when the bowels would respond to nothing. Following this they again became regular and continued so for two weeks, then followed another relapse of six days when they responded to nothing, although cascara, hunyadi and enemas were given each day. Finally, they moved on the seventh day without medicine and continued regular for two weeks, and the patient was discharged. She reported one year later that she had no more relapse and was then regular although she had kept up her horizontal exercises. My experience would lead me to think that women suffer more often than men, but, on the other hand, respond more readily to the exercise treatment. I find the personal equation has some influence upon the rapidity of bringing about favorable results and I am inclined to think that the mind is a factor. Many times at least I am convinced that a confidence in your treatment helps a favorable result.

I have in stubborn cases made use of massage, and personal vibration and pounding over the sacrum and region of the liver, but only for a short time, depending upon exercise to ultimately complete the cure.

There may be simpler and less laborious methods of correcting habitual constipation but I question if any more certain or permanent. It must be remembered that while it is being done an improved general physical tone is brought about throughout the entire system and incidentally often a case of dyspepsia, neurasthenia or other ailment may have been greatly benefited or cured.

If I have not taken your valuable time without giving you something in return, I shall be pleased. I thank you for your patience and kind attention.

UNDEVELOPED PSYCHIC POWERS.

BY ADELAIDE R. KIRSHNER, M. D., CAMBRIDGE, MASS.

The discussions in the May JOURNAL OF ADVANCED THERAPEUTICS, relating to the article, "The Relationship of Psychic Suggestion to Electro-Therapeutics," forces me into an expression on the subject of undeveloped psychic powers.

Psychic suggestion is not valued at its worth by those who possess and use it in its undeveloped forms; and being unconscious of their inherent power, do not recognize the necessity for its development. Strong character, individuality, and personality, are but forms of psychic power, which is the greatest of the mental forces.

What is personal attraction and repulsion? One possesses what the other lacks and needs; and so an attraction is at once established whether in the line of therapeutics, business, or social interests. One's reputation in any walk of life is built up on his ability, his interest in his work, his confidence in himself; and these requisites are felt by all who come in contact with him. This, then, is psychic influence. It is the individual: the I. It is the power of personality. It is faith in one's manhood; faith in one's work of whatever kind, and which no amount of obstacles nor failures can undermine. It is the power of the mind to concentrate all interest on the thing in hand; everything else is swept from view. The individual's thoughts are saturated with his faith and confidence in his methods of work; the atmosphere about him vibrates with his energy, and those present feel the vibrations. Although he may meet with occasional failure, his confidence increases with his successes which goad him on to master perfection in his work. When one line has been mastered, interest grows in another direction, and so on, till the sands of life run out: for life and activity are one with him. But he who is half-hearted, indifferent, wedded to no faith nor interest, is like the wind-tossed autumn leaf. His characterless mind influences none. One cannot give what he does not possess; and to simulate an interest meets with the flattest failure.

Every act of life is an expression of confidence, indifference, or distrust. One draws his disciples in proportion to the strength of his faith in himself, and interest in, or love of his work. That is why one succeeds where another fails.

Every individual possesses this psychic power undeveloped in a greater or less degree. Where nature has bestowed it in abundance, opportunity unconsciously develops it into general success in all undertakings. But where it is developed studiously and scientifically, this power reaches a point beyond com-

prehension. It is the development, or training of it, which makes it a force to be wielded without any other measure, as exemplified by the famous psychologists of the past and present. The clinics of Bernheim, Krafft-Ebbing, and the Charcot school offer examples of this psychic force in therapeutics. Patients are relieved from pain, and cured of ills that have baffled all other measures of treatment; and these are accomplished by a touch, or look, or voice of the operator, which are but manifestations of the psychic power in its highly developed state.

But patients in general, need some material aid to stimulate their *vis medicatrix*, even if it be as diaphanous as Mrs. Eddy's version of the Bible; and physicians have to meet these conditions, giving most attention to the mind's wants in a sick body.

The amount of interest and faith each one possesses in his art, or science of healing, just so much confidence does he inspire in his patient. The success of the New York School of Physical Therapeutics lies in this field. Each professor is a law unto himself. Each has chosen the work best suited to him. Each is so in earnest, so interested, that to the student under his influence, his department is the only one in view. His knowledge of the work, his confidence in himself, are made manifest in his strong personality, which influences student and patient alike. This is undeveloped, or natural psychic power, the force of interest and confidence in the work at hand.

Every moment we are leaving an impress positive or negative on some mind under our care; and according to our interest in the case will success, indifference, or failure be the result.

1010 Massachusetts Ave.

PLANS for the thirteenth annual convention of the American Electro-Therapeutic Association, to be held at the Hotel Windsor, Atlantic City, September 22, 23, and 24, 1903, are assuming shape, and a most interesting program is promised. Excursions to various points of interest have been arranged and social features including a reception will constitute a prominent feature of the convention of this year. Papers of unusual interest are scheduled. Preliminary program will appear in the next issue of this journal.

Errata.—On page 356 of the June issue of the JOURNAL, the sentence which reads "A case of localized scleroderma, at the level of the seventh cervical and intestinal glands, was also much reduced in dimension May 27," should read "A case of localized scleroderma, at the level of the seventh cervical vertebra, involving great pain in the arms, first seen on May 27," and also on page 357, the word "organs" should be "again."

Editorial.

DANGERS OF THE X-RAY.

SOON after the first discovery of the Roentgen ray, the early experimenters found that the newly discovered agent possessed properties destructive to human tissue. Since then the profession has been groping, as it were, in darkness regarding the character of its action. It has become like the poisonous drugs of the *Materia Medica*—an empirical agent in the treatment of disease. Its employment has been in many cases irrational and inconsistent.

The cumulative action, at first not recognized, is now very generally understood, and, instead of the exaggerated notions regarding extreme idiosyncrasy, a knowledge of the methods of employment which has been learned by experience makes its use as aconite relatively safe. It is in its action on deep-seated tumors and others not provided with external drainage that the great dangers exist—the absorption of the broken-down malignant tumor imperiling the life of the patient. He who treats such tumors without regard to consequences will too often destroy life.

When the X-ray is generically considered it is one thing, and when specifically, it is quite another. X-rays are, as their sources; therefore, to judge of the particular action of the X-radiance employed, the operator must take cognizance of its source, the conditions under which it is excited, and the quality of the tube employed. The X-rays are as variable as the dilutions of poisonous drugs, and capable of doing good or harm according to the skill of the administrator. What is required of the operator is a technical knowledge of the sources and the qualities of the X-rays under all conditions. As there is no measure for the varying intensities of X-rays, and no fluoroscopic screen can tell the whole truth, the importance of standardizing apparatus and methods is a question of the greatest importance or an agent capable in skilled hands of doing great good to suffering humanity must necessarily fall into disrepute.

The relative merits of coils and static machines deserves dis-

cussion no more than the variations in coils and the variations in static machines. A static machine having four revolving plates produces a volume of X-rays varying with those from the static machine having twenty-six, and the coil carrying through the primary a four-ampere current with all the varying windings, is quite a different thing from a coil carrying fifteen amperes through the primary and having various qualities of windings. As will be seen, very many things go to make up the difference in X-rays.

It is a well-known fact that all sorts of results are being obtained from the employment of this valuable therapeutic agent. When we appreciate the fact that the profession have to-day no recognized understanding of the physiological actions nor the variations in the qualities of the rays produced, it becomes a serious question.

The accumulated evidence derived from the clinical study of the subject must have formulated in the minds of many operators a definite idea of the character of the actions from the effects produced. The publication and discussion of these opinions will be productive of the eventual solution of this important problem.

* * *

THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

PROBABLY no body of physicians in this country have more honestly at heart the evolution of scientific problems than the American Electro-Therapeutic Association. It is composed of physicians who are not narrow or bigoted, but broad-minded, conservative thinkers, who have found in electricity a valuable means of relieving human suffering. At this time, when so many of the profession are considering the adoption of electricity, these observers who have had experience in its employment can afford great assistance to others who would investigate the subject. Membership in the society is open to all physicians eligible to the American Medical Association.

The editor of this journal will be pleased to receive applications for membership and will furnish blanks to those desiring them.

Progress in Physical Therapeutics.

GYNECOLOGY AND APPLIED METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D., PHILADELPHIA, PA.

Shall We Continue to Have Gynecological Surgeons?

Observers of "signs and portents" could not fail to have much food for thought during the sessions of the gynecological section of the Am. Med. Association at its recent meeting at New Orleans. At one of the largest and most interesting meetings in the history of the Association, the program of this section showed evidence that the great questions incident to the medical and surgical relations of womanhood no longer interested a large proportion of the essayists and speakers. Space and time that should have been sacred to the purpose of this section were devoted to discussions on the operative treatment of the kidneys, the gall-bladder, and the stomach.

Those responsible for the general features of the program were, however, powerless to change the tendency, for they could not compel the many over-modest workers in true conservative gynecology to come forward and bear testimony to their non-spectacular progress and achievements, while the old war horses of the section naturally wrote of the work now interesting them. That this work bears no relation to gynecology, other than the training derived from the wholesale castrations and organic sacrifices, misnamed gynecology, in the recent past, is but another proof that our so-called gynecologists have been, after all, but surgeons in reality, and that it has been a mistake to regard them as covering the whole field of this specialty.

So glaring, indeed, was the rush to the gall-bladder, with dire intent, at the session, that even the useless nature of the vermiform appendix was all but forgotten; and it was finally said that the "gynecologists" interested would desert the section and take their novel "gynecological" discussion into the surgical section. That they were needed in the surgical section to defend their rights was not surprising, for, of all specialists, the omniverous qualities of the general surgeon is most conspicuous.

It is to be hoped, however, that the gynecological section of the American Medical Association will not lose the men who have taught it so much, though some of the lessons have been frankly unlearned, and many have been costly in human suffering. If the editor was a woman he might not take their unalloyed advice as to the necessity for an operation on his person, but, given the necessity, he would prefer that the operation be done by a trained gynecological surgeon, and not by a general surgeon.

The Necessity for a Subdivision of Gynecologic Training.

But the day has clearly passed when we should continue to regard the trained gynecological surgeon and his book of operations as covering the whole subject of the medical relations of womanhood. The *office worker* should come from under cover and bear public testimony that this department is capable of being treated like other departments of human affliction, and that the scalpel is not divinely ordained as the sole weapon in it alone. That the value of physical agencies without a sharp edge is being appreciated to a greater extent to-day than ever is easily ascertained by private report and correspondence, and the columns of this department, as well as the minutes of the section, should show it publicly. Some of the discussions at the New Orleans meeting, indeed, showed an increasing latitude of thought in this matter, particularly in discrediting the recent remarkable efforts to fix the uterus in attachment to the abdominal wall, and recognizing the value of muscular development instead. But if we are to witness an adequate recognition of the value of physical agencies in gynecology it is absurd to expect the problems to be worked out by men who are interested in major operations alone.

G. B. M.

Suggestions in the Treatment of Advanced Malignant Diseases of the Uterus. By Ernest A. Hall, M. D., Victoria, B. C. American Journal of Surgery and Gynecology.

Those of you who have come in contact with cases of advanced malignant disease of the uterus will agree with me that of all conditions submitted to surgical treatment this has proved the most disappointing. It is withal a minor chord that we are compelled to strike in the discussion of this matter. After many attempts with the most elaborate methods the surgeon must often admit defeat, and is able to offer only methods of palliation.

It is a trite saying, that these cases come to us too late. It is these late cases that I wish to discuss. In order that I may not be misunderstood, I will classify the late classes as those (aside from papilloma of the cervix) which are characterized by ulceration with copious discharges, and which can be diagnosed by gross visceral, or digital examination, as distinct from those with less definite symptoms, in which curet and microscope are necessary for diagnosis. Cases with the condition practically confined to the endometrium, I will dismiss with the statement that they are amenable to complete hysterectomy (either vaginal or abdominal, or the two combined), the proportion of perfect cures varying with the skill of the operator.

Pozzi says "the more limited the disease, the more extensive the operation." In cases where the disease is confined to the cervix, a wide section with the galvano-cautery knife might be considered; but the engrafting of the cancer elements upon the raw surfaces can hardly be prevented, which will cause a return of the growth in the cicatrix.

Now, what can we do with the great proportion of cases who have been led to consult us, from the foul discharge and progressive pain?

The answer will of course depend upon the condition. We must remember that malignant disease frequently increases rapidly in growth after being molested—probably on account of the opening up of fresh foci of absorption and irritation of the lymphatic elements, with consequent increased activity of the malignant cellular elements. For this reason, deep curetting is to be avoided; only the necrosed tissue must be removed. It is better, first, to apply caustics, which coagulate and destroy, thus sealing up the vessels. If there is periuterine infiltration, with any limit to the movement of the uterus or if the vagina and region of the bladder be affected, there is nothing to be done beyond the local cleansing, application of caustics, and general measures to relieve suffering.

Surgical measures, other than mild curetting, are absolutely contra-indicated, in such extensive involvement. The patient will live longer, and suffer less discomfort, than when radical operative measures are attempted.

Inoculation of the combined toxins of bacillus prodigiosus, and erysipelas, has not thus far been successful.

The X-ray has relieved pain, but we have secured nothing more, so far, in these cases, from its application.

It has remained to Massey to give us a treatment that apparently meets the indications in cases where the disease is still confined to the uterus and cervix, and also applicable, surgically, in all cases where radical measures are of assistance. His treatment is based upon the fact that during the passage of a galvanic current through the body decomposition of com-

pound chemical bodies is caused—the acids accumulating at the positive pole and the alkalies at the negative pole; also, there is the actual transmission of liquids and solids (in solution) in the direction of the current: “anodal diffusion.” This can be shown by an experiment: Place two porous cups, equally filled with water, in a pan of water of the same depth; then pass the galvanic current, by placing one pole in each cup; in a few minutes, the water in the positive cup will be lowered, while the water in the negative will be higher.

With an amalgamated zinc or copper positive electrode placed in contact with the diseased uterine tissue, and the negative attached to a large abdominal electrode the oxychloride of mercury and zinc (or copper) is formed, which is transmitted through the tissues toward the opposite pole. Thus we obtain greater activity with the nascent chlorids, and a greater degree of penetration than by the ordinary method of topical application. Massey says “the radiating stream of mercuric oxychlorids will be diffused to a considerable distance in decreasing density, depending in extent on the amount and duration of the current, and will produce a zone of sterilization in the cancer cells which succumb, while the normal cells show a mere irritative action.”

The current required for the application of this treatment can easily be obtained in cities where the Edison direct current is used, otherwise a galvanic battery of from 20 to 50 cells will be necessary. The current which I use is a 500 volt direct, supplied by the B. C. Electric Ry. Co. By passing it through a bank of lamps, it is reduced to 100 volts; then through a graduated rheostat, with a milliamperemeter in the circuit. I use electrodes (preferably zinc), with a surface of 9-12 C. and a felt abdominal electrode of 800 C. The positive electrode must be sterilized by boiling; the zinc portion dipped in mineral acid, then into metallic mercury, then wrapped with cotton saturated with bichlorid of mercury, and inserted against or into the uterus. With both electrodes in position, the current is gradually turned on to the extent of the patient's ability to bear, generally from 50 to 150 ma., and continued for twenty or thirty minutes. This may be done daily if the patient can endure it. A removal of the fetor, and a cessation of the discharge are at once noticed, with a blanching of the surfaces and an apparent check in the growth. But of course a cure cannot be thus secured in these late cases—merely prolongation of life and diminution of discomfort.

To what extent must we rely upon the report of the microscopist? To follow the Johns Hopkins' clinic, one would be led to the opinion that the pathological report is all but infallible, but Hunter Robb reports the examination of the scrapings from 100 cases, and he found that in 95 he was unable to make a positive diagnosis by the microscope. And Coe says: “In

younger women in the prime of life, with irregular hemorrhages, where we suspect malignant disease—unless the history is very strong—we should consider the case as doubtful, until proven by the microscope. But in women of advanced years with a fairly well marked history, especially of obstinate, atypical bleeding, when we remove material that is of a suspicious character, we are justified in making a diagnosis of malignancy, even though the microscope throws no positive light upon it."

[The department editor is greatly pleased at this corroboration of his work. He regards the use of the bare zinc-mercury electrode, however, as preferable to the cotton-covered instrument with bichlorid solution.]

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

The Fifty-fourth annual meeting of the American Medical Association, was held at New Orleans on May 5th to 9th. Instead of waiting until the papers relating to Genito-Urinary disease are printed in extenso, we will refer to them in advance with a brief mention from the summary.

Suppression of Urine. By H. J. Whitacre of Cincinnati.

A case is reported of suppression, in a young female, after she had herself induced an abortion by passing a catheter into the uterus and taking large doses of ergot. During two days she had passed only four ounces of urine. Her temperature was nearly 105°. Remedies did not alleviate the condition and the kidneys were accordingly decorticated with the result of a normal secretion of urine after one hour. After this time the patient improved. In obstructive suppression the author recommends only a surgical treatment.

The Operative Treatment of Enlarged Prostate. By William Thomson, British Medical Journal, London, April 18.

This writer prefers the operation by supra-pubic cystotomy, fearing very little extravasation or sepsis though slow recovery. The perineal section has other and more dangers, which consists in difficulty to reach the prostate, making a thorough exploration of the bladder or an encysted calculus. Sometimes he finds that rectal examinations may be deceptive in calculating the obstruction. He uses a rubber pad to prevent hemorrhage from the prostate, which is introduced through the wound, and

can be removed by a string attached to it. He considers the possibility of enucleation.

Fat Necrosis of the Kidney. By J. R. Guthrie of Iowa.

The cause of the fatty degeneration of the kidney is not yet understood, it might originate from bacteria. It is associated with changes in the circulation, venous congestion, or narrowing of the arteries. These conditions may be caused by prolapses. In one case, when the prolapsus was diagnosed he performed nephrectomy.

The Surgical Treatment of Nephritis. By A. H. Ferguson, of Chicago.

The author reported his cases of operation. The diagnosis was confirmed with microscopical examination by Klebs. He claims priority, and had his cases published a month ahead of Edebohls. These cases were of interstitial nephritis.

The Better Methods for the Repair of Perineal Structures. By H. O. Marcy of Boston.

The author described the technique of his operation of buried sutures, by which he avoids the danger of a subsequent infection. He prefers the use of buried animal sutures.

Uretero-Cystotomy with Traction on the Ureter. By Clarence A. Smith, Northwest Medicine, Seattle, Wash., February.

This is a report of experiments in finding the anastomosis of the bladder and ureter under tension. Nephritis and atrophy of the kidney on the side operated on may be a consequence, but it may follow any operation for uretero-cystostomy.

Total Extirpation of the Prostate for Radical Cure of Enlargement of that Organ. By P. J. Freyer, M. D., British Medical Journal, London, April 18.

This is a report of thirty-one cases of complete removal of the enlargement by the supra pubic cystotomy. Of course there could be no relapse. There were four deaths, of which only one from coma which was due to retention can be counted, and even this was from retention of morbid products of the urine, which were present before the operation. This result compares very favorably with perineal section.

Uræmia and its Treatment. By W. H. Thomson, Medical Record, New York, May 16.

This paper is excellent and should be read as delivered in an address before the Medical Association of Greater New York, January 12, 1903. It begins with "Correct physiology is always an essential prerequisite to correct pathology." If even more than half the kidneys have been removed, more urine and

more urea will pass, than did before that operation. This statement is a riddle. One case is cited of obstructive uræmia without the usual symptoms of toxæmia. The patient remained conscious, but died of asthenia. Hence the conclusion is that uræmia has different symptoms in patients, but one is generally always present; the contraction of pupils. The treatment should be directed to sustaining measures and improve the action of the heart. In other cases particularly during scarlatina, the suppression may be allayed by diuretics and cathartics, as an evacuation of the bowels is generally associated with micturition. Calomel is indicated in many cases. Edebohls' surgical operation is mentioned. The paper is concluded with a description of albuminuria, which was once considered synonymous with Bright's disease, but is only a symptom, the significance of which greatly varies.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

The Effect of Climate on Laryngeal Tuberculosis with Special Reference to High Altitudes.

The climatic treatment of tuberculosis always has been and still is, a subject of much interest as well as discussion. It must be admitted that no definite conclusions have as yet been arrived at, and that the advocates of the home treatment, the sanitarium treatment, the treatment by removal to high altitudes or to sea level, have presented many convincing arguments in favor of each.

Carefully prepared statistics on this subject by Robert Levy, of Denver, Col. (Laryngoscope, October, 1902), show the following conclusions:

In cases developing both lung and throat lesions in Colorado the throat lesion manifests itself forty-eight weeks later than in those originating elsewhere. It would, therefore, seem that so far as the development of laryngeal tuberculosis is concerned, the effect of high altitudes is to retard it by more than one year, notwithstanding the natural tendency for the occurrence of this very common complication of pulmonary tuberculosis.

Serum Therapy in Laryngeal Diphtheria.

In connection with the article on "serum therapy in laryngeal diphtheria" published in the February issue of the JOURNAL OF ADVANCED THERAPEUTICS, the following case reported to the Editor of this Department by Dr. Geo. B. Swasey, of Portland, Maine, will be of interest:

"One month ago I had a case of laryngeal diphtheria in a child sixteen months. I saw him on the third day of the disease which was Monday. Tuesday I gave him 2000 units of Mulford's Standard Antitoxine, Thursday 3000 units, Saturday, the eighth day of the disease, he appeared worse than any day before and I gave him 3000 units more, 8000 units in all. From this date he improved rapidly and was out of danger in two days more."

A New Localizer for Determining the Position of Foreign Bodies in the Eye by the Roentgen Rays.

In order to minimize the difficulty in determining from some finder or localizer opaque to the Roentgen rays and placed outside the eye, the exact position of the foreign body, Dr. W. L. Fox (Philadelphia Medical Journal, No. 15) has devised a localizer which comes in contact with the anterior half of the eye, the geometrical shadow of which, projected on a photographic plate, aids in locating the foreign body in the orbit or eyeball. This device consists of an oval band of gold or silver about .75 m. m. wide, and so shaped as to conform to the shape and curves of the eyeball, and provided with gold strands crossing in front and dividing the instrument into quadrants. He sometimes forms the localizer of different shape, using two concentric bands or circles with cross-wires, leaving a round clear space for the cornea. It is applied directly to a cocaine eye without impeding its rotation or following movement. The crossed wires are brought directly over the center of the cornea, the photographic plate is placed in contact with the temple of the injured side, and the Crookes' tube is then placed so that the rays shall fall as nearly as possible perpendicularly upon the plate. If the foreign body lies within the shadow of the localizer it must be in front of the equator of the eyeball. Its distance behind the shadow of the instrument also determines its location either in the posterior part of the globe or orbit. A control test may be made by placing the plate in front of the eye and making the rays pass through the head. If the foreign body is very small and should lie below the shadow of the localizer, an additional temporal occipito-frontal picture must be taken with the source of rays at a diverging angle and not perpendicular.

Local Electric Treatment of Ménière's Disease.

Of fifteen cases treated by local application of static electricity reported by Bayer (Journal American Medical Association, October 25, 1902), seven were improved or cured. He emphasizes that all catarrhal symptoms, etc., must be abolished before applying the electricity. He aims to flood the tympanum with the electric emanations, holding the end of the electrode about a centimeter from it. No inconvenience of any kind

was observed. He varies the form of the application as indicated, preferring the brush for its soothing effect in congestion, and the spark when a stimulating action is desired. Sclerosis requires a vigorous application of both. None of his patients were hysteric or neurasthenic.

DERMATOLOGY.

EDITED BY ALBERT C. GEYSER, M. D.

Dr. T. J. Buchanan's conclusions are as follows: Superficial epitheliomas, lupus, rodent ulcers, eczema, and many kindred skin affections can positively in many cases be cured with the Roentgen rays; the growth of deep-seated carcinomas can sometimes be retarded and the pain very much lessened by means of the Roentgen rays, but that such patients can be permanently cured is as yet not demonstrated; a tube of medium high vacuum is better suited for Roentgen ray therapy than a tube of low power, particularly for deep-seated carcinomas; the part exposed should never be nearer the tube than 12 inches; an exposure should never last longer than 5 or 10 minutes at one sitting; an interval of 3 or 4 days should intervene between each sitting; in order to produce a cure it is neither necessary to produce a burn nor cause any reaction whatever; all cases of inoperable carcinomas, sarcomas, etc., should be treated with the Roentgen rays before they are abandoned as hopeless; the operator must be one well skilled in the use of the apparatus, and after the suspension of treatment carcinomas show a strong disposition to quickly return.

A. C. G.

Scleroderma.

W. Ebstein reports two cases of scleroderma in children. The first patient, a boy of 8, had the disease in its incipency; it had begun with a "rheumatic" onset three weeks before. The skin was thick, did not glide over the underlying tissue, was cold and slightly oedematous. There was vasomotor irritability; the tongue could not be put out, the lips and cheeks were stiff, etc.; the skin reflexes were increased. After a three months' course with baths containing from 1-4 per cent to 1-2 per cent. of clay, massage with a borated salicylic ointment, and the internal administration of sodium salicylate, 3 grams (45 grains) daily, the boy was improved beyond expectation. The second patient, a boy of 5, reached the clinic one year after the onset of the disease. The sclerosis was very extensive, and contractures of some of the joints had formed. A number of pale scars were seen at different parts of the arms. In this case treatment availed but little. Of all therapeutic measures in this disease, Ebstein thinks better of massage than of any

other, but if results are to be obtained, treatment must be early and energetic.

Two cases came under the notice of the Manhattan Dermatological Society during the last year: one an infant under the care of Dr. Sobel. This case was treated with baths and massage and made an excellent recovery during the short space of time of only six months; the other an adult under the care of Dr. Abrahams. The patient was reexhibited about four months later showing marked improvement, the doctor claimed the good results due to Hyroid extract up to gr. xv. t. i. d.; he however took the precaution to administer strychnine gr. 1-40 with each dose; the results in both of these cases were all that could be desired.

A. C. G.

Dr. W. R. Fox (Australasian Med. Gaz. June, 1902) gives a detailed account of the treatment of rodent ulcer by electrolysis. He uses a voltage of from 40-50; which may however be increased; the amperage used ranges from 300 to 1000 milliamperes, the needles are inserted at the margin of the sound tissue 1-2 inches apart, after a few minutes the current is reversed until the portion between the needles blanches and assumes a dead appearance, which it in fact is; one needle is then withdrawn and advanced 1-2 inch until the entire area is covered; the whole process of course requires a general anæsthetic.

(This method closely resembles the work done by Dr. Massey for the past few years; he makes use in conjunction with the electrolytic treatment of the distribution of nascent mercury in the tissues.)

A. C. G.

Lupus Vulgaris.

Dr. H. R. Varney (Harper Hospital Bulletin) records his first fifteen cases of lupus personally treated; he claims permanency in 86 per cent. as more than one year has elapsed and in many cases more than two without a recurrence; his method and technique do not differ from that usually observed, but his results are gratifying in the extreme especially when it is considered that these cases were all hospital cases and under close observation during and after the treatment.

A. C. G.

A Treatment for X-Ray Burn.

If what Dr. J. W. Hamilton claims he has accidentally discovered proves upon trial to be as he says it is, we have a much needed remedy for X-ray dermatitis. The Doctor claims that after using a number of vaunted remedies, he accidentally tried some plain lanoline upon his own finger, with very encouraging results; he then used the same upon four of his patients with equally good results. We hope it will prove so.

A. C. G.

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Sunshine and Fresh Air vs. Roentgen Rays and Finsen Rays in the Treatment of Tuberculosis of Bones and Joints.

Willard presented a paper on the above subject to the section on Surgery and Anatomy of the American Medical Association at its recent meeting. He points out that the inhibitory action of light on tubercule bacilli was demonstrated some years since, and that, while indirect exposure to sunshine produces no direct effect upon tubercule bacilli, patients are very much benefited by its general effect. He strongly advocates the treatment of tuberculosis of bones and joints, as well as of the soft parts, by sending the patients out of doors in the sunshine, protecting their eyes with green glasses, having them live in tents and feeding them on milk and eggs. He believes that sanitarium treatment of diseases of the hard as well as of the soft tissues will give equally good results, and that tent life in the pine woods is especially favorable. The bactericidal action seems to be almost entirely in the blue violet and ultra violet rays of light. He does not believe that the bactericidal action of electric light is as strong in practice as sunlight, although found to be stronger in laboratory experiments. The disadvantages of the Finsen treatment he sums up as follows: A large staff of nurses, exposure of but a small area at a time and the expense of running a Finsen equipment, which he puts at \$3000 a year. He also believes the X-ray to have a certain germicidal power, but that greater experience is necessary to determine its value in tubercular joint and bone lesions. Mechanical and other means should not be neglected.

At least five years' experience with the newer methods he regards as necessary before their value can be definitely defined.—American Medicine, May 30, 1903.

Light in the Treatment of Lupus and Other Chronic Skin Affections.

Kime prefaces a report of a series of cases treated by means of light and the manner of its use by the statement that "light and especially concentrated actinic light derived from the sun, is a specific in the treatment of lupus, chronic ulcers, and other destructive lesions of the skin." He utilizes sunlight as a source of light—from which the supply is unlimited, the strength the greatest, and the actinic power the richest. A modification of the ray-filler used in photography, which, at a distance of eighteen inches, focuses to a very fine point, giving a violet-colored light, is used by Kime. At the smallest focal point it is intensely hot, but in certain cases he finds that nothing short of this strongly concentrated irritant light will sufficiently

arouse the tissues to action to initiate the process of repair which, once started, continues to complete recovery.

The cell used is so constructed that it is readily adjustable at any angle to catch the rays of the sun. With a beam of sunshine one foot in diameter falling through the office window, the instrument is ready for use.

Technique.—The surface of the wound is thoroughly cleansed, all scabs and crusts being removed, and it is then washed with water.

(Kime has avoided the use of antiseptics, as he wished to determine the specific action of the violet rays.)

The patient is then seated and the cell is placed between him and the sun at a distance of about eighteen inches, i. e., the focal point. The entire diseased area is exposed to the action of the light until the albumen in the tissues is coagulated, when it is of a smoky-white color. A few minutes are required for this. The treatment is then handed over to the nurse, who places the patient either a little beyond or a little short of the focal length, who continues the application for twenty minutes. A dressing of absorbent cotton, wet in water, is then applied until the following morning, when she removes it and reapplies the light at just under or over the focal point for twenty minutes, dressing it as before. The treatment is daily, and on the third day Kime uses it himself again at the focal distance, especially to any part of the diseased area which has not responded to the irritant action of the light. Within a few days granulations begin to spring up around the edges of the wound, new integument begins to form around the borders and gradually the size of the wound diminishes until restoration is complete. The action of the light thus applied is: (1) strongly germicidal, and (2) it is a powerful irritant to the tissues. By its irritant action an increased blood supply is furnished, new food is brought in abundance to the starving tissues, and a retrograde metamorphosis is converted into a reconstructive process. By its germicidal action a malignant sore is converted into a simple one, and nature brings about the cure in the ordinary way.

Four cases are reported, with photographs before and after, three of lupus and one of chronic ulcer of the leg, cured.

The lens consists of a glass convex lens eighteen inches focal length, and is six inches in diameter. Behind it, at a distance of three-fourths of an inch, is placed a circle of plain plate glass. Between the lens and the plate glass is the space for the solution of copper (combined with alcohol to prevent freezing), which both cools the heat of the sun's rays and absorbs all but the blue rays, which contain but little heat and are rich in actinic power. The lens is mounted so that it may be raised

or lowered or adjusted to any angle, according to the locality to be treated.—The Journal of the American Medical Association, April 11, 1903.

Auxiliaries in the Treatment of Consumptives.

Juettner, in discussing the above subject, finds in addition to massage and gymnastics of the chest, inhalations of oxygen and ozone, the use of high frequency currents and hydrotherapy phototherapy occupies an important place. There is no question but that light and bacterial life are in inverse ratio to each other. There can be no doubt, he says, but that light represents a therapeutic factor of enormous importance in the treatment of consumption. The sunball of the old Greek physician has been sanctioned by the modern photo-therapist. The rays of the electric arc possess some of the power of the sunlight, especially through the instrumentality of the chemical end of the spectrum. The body of a consumptive should be exposed to light as much as possible. The local use of the chemical rays are surely destined to become a therapeutic feature ere long. From the germicidal property of the light it is reasonable to suppose that in suitable cases of tubercular infection of the apices much can be accomplished by the use of light. Juettner reports two cases under treatment. They receive an hour's exposure, the light falling on an area of one and a half inches square, corresponding to the location of the apices within. The patients are improving, whether from the light or not, Juettner regards as conjectural. The X-ray he regards as of doubtful value.—The Journal of Tuberculosis, April, 1903.

A Pertinent Correction.

The following letter from Dr. W. H. White, of Boston, is a timely one:

The opinion is wide-spread that vacuum tubes connected with a source of high-potential and high-frequency current emit the blue violet and ultra-violet rays of light and that the therapeutic effect obtained by their use is due to these rays. The writer believes with Dr. White that the physiological action and therapeutic effect of vacuum-tube discharges is that of a high-frequency current. For ultra-violet light the best source is without doubt the static arc.—M. A. C.

Mr. Editor—In a Western journal for April there is a report of a lecture on "Ultra-Violet Ray Therapy and Vacuum Electrodes," given to a class on electro-therapeutics, in which it is stated that the vacuum tubes emit the ultra-violet rays.

Vacuum tubes are used with a source of high-frequency current, static machine, or coil, and the coloring may be blue, pink,

or violet, according to the quality of glass and the degree of vacuum in the tube. A blue-colored incandescent light gives simply the bluish color from the stain into which the lamp was dipped; if dipped in a red or green stain, the light would take on those colors simply from the stain. Ultra-violet rays cannot pass through glass. In order to secure their transmission lenses of crystal must be used, and with them the tungstate of calcium screen will give the ultra-violet fluorescence.

The violet ray is given out in a small quantity, with a series of soft iron balls interrupting the spark of a static machine or high-frequency coil (the Görl lamp), but the best results are obtained from lamps having whole or in part soft iron terminals, connected with a source of continuous or alternating E. M. F., as supplied by the street current.

The therapeutic effect of the vacuum tube is from the high-frequency current, which is very beneficial in many conditions, but should not be confounded with the ultra-violet ray now being used for various forms of skin disease.

WALTER H. WHITE,
220 Marlborough St., Boston.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

Notes on X-Light. By Wm. Rollins, The Boston Medical and Surgical Journal, April 2, 1903.

He finds that many investigators who have worked with the X-light have greatly impaired eye-sight, resulting from the effect of the rays upon the crystalline lens. That the author had escaped injury has been due to an early recognition of the dangerous nature of the X-light, and to having taken certain precautions, which follow: First, no X-light should strike a patient except the smallest beam that will cover the area to be examined, treated, or photographed. Second, no X-light should strike the observer. Directions are given for the construction of apparatus to meet the above conditions.

J. D. G.

Some Experiments with the X-Ray as a Therapeutic Agent.
By Edwin Walker, M. D., Ph. D., Journal A. M. A. May 2, 1903.

He reports a case of alveolar melanotic sarcoma cured by the X-ray. The case, a farmer, aged thirty-one, history negative. A rapidly growing dark tumor appeared on the right cheek in front of the ear which was excised but failed to heal and began rapidly to recur. There also appeared a nodule below the angle of the jaw. Another operation was performed and an

effort made to remove far and wide all diseased tissue, which was a failure. The disease began to return in a few days with redoubled activity. The X-ray was then employed and pushed with energy. Improvement began immediately after the first treatment. In two weeks the wound was healed and all of the infiltrated tissue began to soften up and disappear, and after several months the case is reported cured, with no sign of recurrence. This tumor was proved by competent bacteriologists to be an alveolar melanotic sarcoma. The cure of a case of melanotic sarcoma is always an interesting case, and we congratulate Dr. Walker on his splendid success.

The Treatment of Trachoma by X-Ray Exposure and the High Frequency Current. By Sidney Stephenson, C. M. and Dr. David Walsh in the Medical Press & Circular, February 18.

They report four cases of trachoma treated with focus tubes. The eyes appeared to be cured in two, while such marked improvement took place in the other cases as to promise an equally favorable result. On several occasions slight dermatitis of the eyelids was noticed and also on the face, but a shield and mask of lead prevented any further mischief. The cure took place very rapidly. Every case showed definite improvement from the first exposure. The immediate effect of the X-ray was to render the granular bodies redder and more prominent which was followed by rapid absorption of the granulations. A high vacuum tube was used, one which backed up an eight inch spark gap from the coil. The tube was placed at an average distance of eight inches from the surface and exposures were made, for from ten to fifteen minutes each.

J. D. Gibson, M. D., Birmingham, Ala.:

DEAR DOCTOR: I think the readers in your department might possibly be interested in a simple form of shield for use on the X-ray tube that has given quite good service to me for treating small epitheliomas about the face. It saves a variety of masks. It also furnishes the patient with perfect protection in case of possible collapse of the tube, and, best of all, anyone can make it. I use a proper thickness of lead foil, to be opaque. Between that and the tube I use unvulcanized rubber, such as dentists employ for false teeth. Together I mold these so as to fit the curved front surface of the tube. The whole is covered on both sides with silk, and silk strings are attached for tying this to the front surface of the tube. The opening is made about one inch in diameter in front of the anode, and, of course, the light passes through that opening, which can be made

smaller or larger. It can easily be directed upon the particular portion one wants to treat. I have used it on high-vacuum tubes, without any tendency for sparks to leap across. It is possible that ordinary rubber sheeting might do, just as well as the unvulcanized rubber. I have not tried it, but intend to experiment with it myself. I am also using a new idea in multiple interrupters that I like very much, instead of pulling out a rod so as to throw in one spark-gap, after another. Mine is made so that I always have ten spark-gaps. Five small pieces of brass are on one piece of rubber, and six others on another, and with a screw I close tightly together these, or separate them as far as I think it necessary, always having all the spark-gaps in action, and varying my effects by the length of the sparks, regulated by the approach or separation of these brass pieces.

Very truly yours,
W. P. SPRING.

In the Hemisphere of X-Ray Activity. By J. Rudis-Jicinsky.
A. M., M. D., M. E., New York Medical Journal, May.

"Statements that the greatest intensity of the rays is only at the point where the hemisphere of X-ray activity ends and the dark hemisphere begins, or that the X-rays produced in a vacuum tube with the help of a static machine do not "burn," and further that the coil is better in this kind of work than a static machine, or that paraffin, vaseline, and what not, may be used in protection of healthy tissues in the treatment of malignant growths, lupus, tuberculosis of the joints, glands, tuberculosis pulmonalis, some chronic lesions of the skin, sinuses, etc., are statements which will not and cannot stand the tests of actual experiments and the results thereof.

The best skiagraphs, and the best results in the treatment with the unknown ray of Professor Roentgen were obtained in the hemisphere of X-ray activity, or the field of the best rays of penetrating properties. These hemispheres or fields of activity or non-activity of the X-rays in a Crookes' tube may be seen and made out better fluoroscopically and determined photographically, if we wish to. Within the limits of this hemisphere of activity, an object opaque to the X-rays will cast a shadow, easily detected with the help of the fluoroscope or by the image it produces upon the photographic plate, but to know and to find out exactly the best point of the best rays of X-ray order, is the main part in the new art of proper diagnosis and treatment in medicine and surgery. When the point is known to us, it is comparatively easy to secure proper illumination and position of our subject in skiagraphy, and in therapy the most astonishing results. It is a matter of fact, and any one of us may satisfy himself by experiment, that the X-rays are pro-

jected in all directions from that side of the reflector opposite to the cathode. When the tube is very low, we may observe a peculiar cathode stream, in the form of a pencil of violet color, strike the middle of our reflector in the tube. This is the point where the cathode rays strike first, and it is here where to

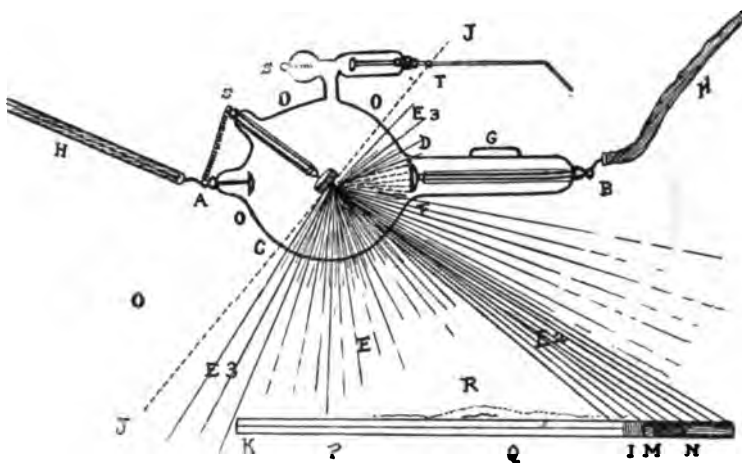


FIG. 1.—A, Positive. B, Negative. C, Anode. S, Auxiliary anode of R. F, Universal regulating tube. D, Cathode. T, Auxiliary cathode. E, Hemisphere of X-ray activity. E2, Hemisphere of X-ray activity, most intense radiation and penetration. The metacarpal bones of the hand cast hardly any shadow at the end of the plate, being under the greatest intensity of the best rays. Three different shadows showing the degree of over illumination. The bones with the lesion proper (R), lying in the triangular field of the radiation from P to N, cast shadows of which correspond exactly with the radiation from the platinum disk of the anode as a source. No intensifying screen used. Usual developing. Short exposure. Distance of the tube eight inches. F, Cathode stream-violet, seen in the beginning of the bombardment, and two lines of the same color at J. G, Tube Holder. H, Connecting wires in rubber tubing. J, J, The end of the hemisphere of X-ray activity. K, Dry plate in two envelopes, orange and dark. L, The effect of the X-light radiation from the anode focus point on the plate strong. M, Stronger, see the skiagraph. N, Most intense, with great amount of penetration. Overillumination. Between Q and P, shadows showing proper illumination on short exposure, but not the internal structure of the bones so good as at L and M. O, Dark hemisphere with practically no X-rays. P, Lower part of the plate. Q, Upper part. E3, Departed rays.

look for the most beautiful X-rays. From this point, an imaginary line drawn perpendicularly at right angles through the tube will show us the maximum of the X-ray field. This point must and most assuredly will depend upon the form of the tube, the form of the cathode and the anode, with or without a separate reflector, and upon all the individualities of the tube itself. It is therefore necessary to find out the source and the proper point of the X-ray in each individual tube,

before we can repeat the best photographic features of others or expect any results in therapy.

We know that a body is heated by having the motion of its molecules quickened, and cooled by parting with some of its molecular motion. One body is hotter than another when the average kinetic energy of each molecule in it is greater than in the other. The heating of the anode in our tube is the best proof of it, and shows, not only that the rays are anti-cathodic, but that there a real bombardment takes place. The particles of gas in a Crookes' tube, and also those occluded in the terminals, become electrically charged, and carry their charge from one terminal to the other when the tube is in action. The steam goes from the cathode to the anode. The greater the quantity of charge imparted to the particle, the greater will be its repulsion and the force of the bombardment. This breaking up of the particles produces the X-ray; therefore the more particles we have in action, the greater will be the quantity and quality of the rays. To have a great contrast in our photographic work, to picture not only the shadow but the substance also, the internal structure of the bones with beautiful depth and perspective, and to get good results in therapy, we must have a good source of electricity and certain intensity of bombardment to each particle in our Crookes' tube. It will readily be called to the mind of every thoughtful X-ray worker, that a good X-ray tube is the secret of the success in X-ray diagnosis and therapy. No matter how well your static machine or coil does its work, you will never get good results unless you use a tube with the proper source of electricity behind; and it makes no difference whether it is a static or a coil, the tube with both being equally dangerous in unnecessarily prolonged exposures, and in unskilful hands. We have to remember that the vacuum of a Crookes' tube is a constantly changing quantity and should not be relied on to remain constant; it differs in different tubes, and sometimes in one and the same tube. We therefore have always to watch our tube. To know our tube, the resistance of the same, and especially the proper technique in illumination, is the main key to successful skiagraphy.

Is it not most natural, that at the point of the most intense bombardment we shall find the greatest amount of production of the X-rays? And if so, that the greatest intensity of the X-rays will be directly under this point in a straight perpendicular line at the angle shown in our illustration:

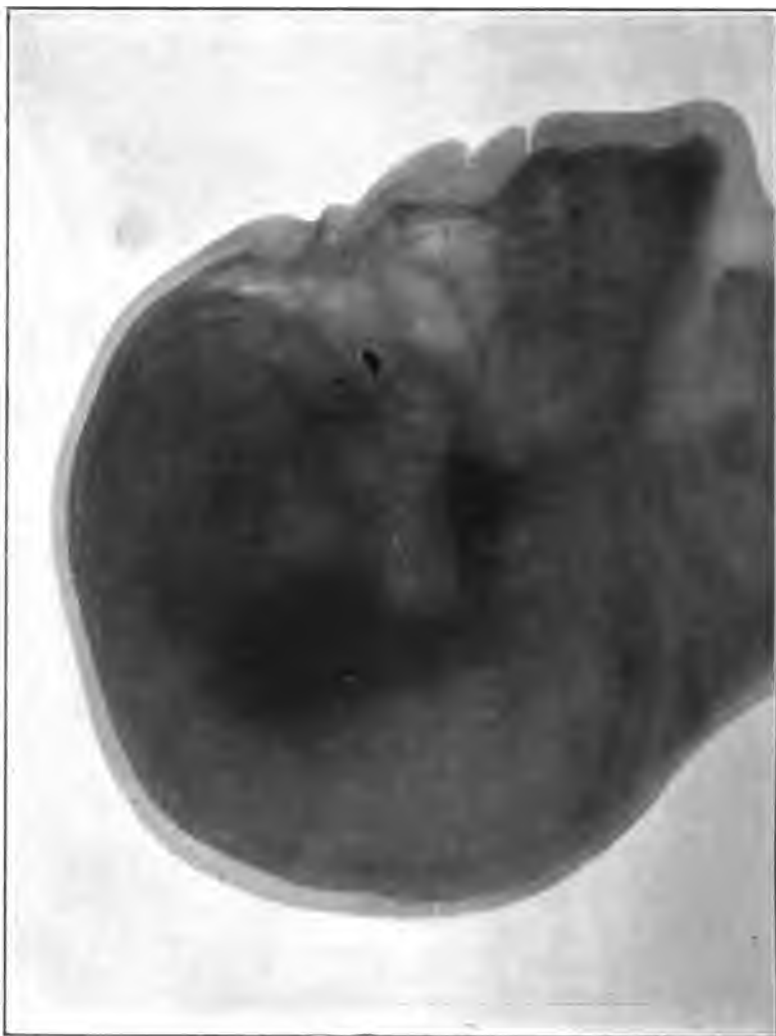
The skiagraph resulting from the arrangement of the platinum disk in our tube, as stated above, is reproduced in Fig. 2, which shows in print, but not so well as in the negative itself, that the metacarpal bones of the hand give about three different shadows, much lighter, but with little more detail in the substance of the bones, and at the end of the plate no

shadow at all, showing that the upper part of the plate was therefore directly under the point of greatest intensity of the X-rays. The parts so exposed, the metacarpal bones, were directly in the perpendicular line from the middle of the



FIG. 2.—Skiagraph of excessive callus formation after Colles' fracture. Note the difference of shadows given by the bones of the metacarpus.

platinum disk or the middle anode focus point. The other bones, especially the lesion proper in the radius, cast shadows which correspond exactly with the radiation from the anode in the hemisphere of the X-ray activity, showing the results of the same length of exposure, but with difference in penetration.



Skiagraph. By Dr. Russel H. Boggs of Pittsburg, Pa.

I. Bullet in head:

(1) Regulating tube set so that it would back up a five-inch spark.

(2) Exciter: A 15-inch induction coil with fifteen amperes going through primary.

(3) Tube distance twenty inches.

(4) Time of exposure, one minute.



Skiagraph. By Dr. Russel H. Boggs of Pittsburg, Pa.

II. Fracture of Humerus:

(1) Regulating tube, set so that it would back up a three-inch spark.

(2) Exciter—Fifteen-inch induction coil with eight amperes going through primary.

(3) Tube distance twenty-two inches.

(4) Time of exposure, forty seconds.

THERMOTHERAPY.

EDITED BY CLARENCE EDWARD SKINNER, M. D., LL. D.

The Importance of Heat, Water, Electricity, and Diet, in the Treatment of Rheumatism. Alfred S. Jaeger, A. B., M. D.
The Medical and Surgical Monitor.

In the course of his article the author refers to dry hot air in the treatment of rheumatism as follows: The writer is firmly convinced that the virtues of the mineral bath as a cure for rheumatism are greatly over-rated. It is the heat of the water and not the mineral in it which does the good; and after corresponding with several gentlemen who are authorities on the treatment of rheumatism, he has yet to hear from one who has gotten any results from giving the mineral bath other than hot. We can get as good results from the use of hot city water as from any of the mineral springs. It must not, however, be forgotten that the psychical effect on the patient who has been sent to the mineral bath, due to change of surroundings, etc., will in itself, frequently produce a change for the better.

"Heat in the form of hot bath, hot pack, vapor bath or dry hot air, is a great assistance to us, and in connection with the judicious use of the salicylates, is the best method of curing this disease. One hot bath a day, keeping the patient in it from fifteen to twenty minutes, and when it can be borne two baths daily, are not excessive. The water should be as hot as can be borne without discomfort, which as a rule is 95° F. to 105° F. There are some patients who cannot stand the hot bath, and here the hot blanket pack is useful. In some cases it is well to give one hot bath and one vapor bath daily. Care must be taken in giving the vapor bath, as it is very depressing to some, and collapse must be guarded against. Dry hot air is excellent treatment and it is to be regretted that it cannot be used more often in private practice. The portable hot air ovens do not heat the air sufficiently to do much good, and it is out of the question to have your patient in the acute stage of rheumatism come to your office for treatment. In hospital practice the patient can be wheeled to the oven, and this treatment is applicable."

(While it is true that the gas pressure in the average house is not great enough to render possible the attainment of a sufficiently high degree of heat in the portable dry hot air apparatus to give the best results, this should not be considered a reason for abandoning this apparatus. The difficulty may be overcome by using gasoline instead of gas, tanks and burners for which are furnished by the dealers. With gasoline as the source of heat, any desired elevation of the temperature of the

air applied may be attained. Of course more care is necessary when using gasoline.—Ed.)

"The treatment should last an hour, and the heat should not be lower than 300° F., or higher than 500° F., according to the ability of the patient to stand it. One treatment daily is usually sufficient, but in severe cases two may be necessary. The hot air treatment is of great value in the sub-acute and chronic forms, when the pains have left, but stiffness remains.

"Heat should be used not only by the methods mentioned, but at the same time, while the patient is in bed he should be surrounded by hot water bags, hot bricks, etc. The heat not only favors elimination but acts directly as an agent reducing the rheumatic inflammation.

"Recent writers in American and foreign medical journals have laid stress on the fact that when heat is applied to a suppurating part, it increases rather than diminishes the pain. This may be used as a point in the differential diagnosis of rheumatic joints, as it is a well-known fact that such joints never suppurate (should suppuration occur, it is due to secondary infection with one of the pus producing germs), and it may therefore be well for us, when heat increases the pain of a joint, not to stop at a diagnosis of articular rheumatism, but to search further for the cause of the trouble."

Application of Heat in Therapeutics.—Ullmann's apparatus was described in the journal of July 26, 1902, p. 225. The local sweating is merely an accessory factor in the cure. The chief benefit is from the bactericidal effect of the high moist temperature, the promotion of absorption and the histoplastic and sedative action of the heat. The bactericidal effect is most marked in the abortive treatment of venereal ulcers and other necrotic ulcerative bacteriogenic processes in the derma. It is accompanied by absorption in the abortive treatment of acute gonorrheal rheumatism, also in prostatitis, gonorrheal periurethritis, follicular abscesses, epididymitis, gonorrheal funiculitis and inflamed or ulcerating buboes, infectious granulomata, syphilis, actinomycosis, etc. It is especially valuable for the promotion of absorption of old inflammatory infiltrates or acne and in the "borderland" affections, remains of exudates in joints after rheumatism and gout, periostoses, ostitis, inflamed varices, hemorrhages after dislocations or other trauma, and to promote the healing of suppurating wounds by checking the profuse leucocytosis. Its histoplastic action is especially marked in atony and torpid granulation, tendency to ser-piginous growth and destruction of tissue. It soothes the pain in inflammatory and neuralgiform conditions of all kinds, even including the cases of tissue alienation in the nerves themselves. The only contraindications seem to be a tendency to hemorrhages and tuberculosis or acute infectious diseases. Application of constant heat by this method has been eminently suc-

cessful in the domains of laryngology, ophthalmology and gynecology, and is being used extensively in veterinary practice to supplant blistering, and in laboratory experiments. By gradually raising the temperature to 39 or even 48° C., and keeping it at this point for two to five hours, the local active hyperæmia, œdema, hemorrhages and necrosis induced at first gradually retrogressed to complete restitution, with the exception of the necrosis. Rabbit skin is much more tolerant to high temperatures than human skin. The loosening up of the tissue by this moist heat and the changed and increased metabolism in the parts, with its unquestionable powerful influence on the nerves, are important factors in the benefits of this form of thermotherapy.—*Jour. A. M. A.*

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

With the approach of the summer season it behooves the practitioner of Medicine to bear in mind that there are certain remedial measures by which damage to many persons may be averted and it is in this seasonal suggestion that the writer wishes to favor the proverbial saying, "An ounce of prevention is worth a thousand pounds of cure." The average individual is woefully neglectful of the application of cold water to the periphery of the human body. In winter the mere suggestion of the cold bath, of low temperature (40 to 60 F.) causes a shudder of disapprobation and a longing desire for a bath of high and luxurious temperature. In more or less degree, this is true of summer and seems inherent in the average individual. When one considers that the action of cold water applied to the surface of the body is a tonic to the vasomotor mechanism and central nervous system; that it is a powerful eliminant; that it is a stimulant to the secretory and glandular structures of the entire body and that through its action the vasomotor system becomes flexible and adaptable not only to atmospheric changes but extremes of temperature and through its daily use the system acquires a rapidity of action that is valuable in the prevention of the ills that arise from the pathological action of heat or insolation. No reference whatever is made here to the now classical methods of hydrotherapy for the purpose of abstracting heat but only to the physiological effects of the cold bath and the patent results obtained by its use in preventing heat

effects. In a subsequent issue the treatment of sunstroke and its after effects will be dealt with and some newer methods that in the writer's experience have as adjuvants proven of singular benefit. He refers herewith to the value of the cold plunge, the rain, the circular, needle, jet, or other cold douche as a physiological preventive of the highest importance. It has been the writer's observation for a number of years that the changes arising from increased skin action, the result of the daily use of the cold bath serves to thoroughly protect the individual and prevent mischief. In this country, the population rich and poor, is as a rule well supplied with the means of taking cold baths and it should be a duty of all intelligent physicians to instruct their patients to utilize these methods not only for the prevention of sunstroke but for the preservation of good health and functional activity.

C. P.

A Case of Nævus of the Scalp and Nose Treated by Hot Water Injections. By Frederic Griffith, M. D., New York Medical Journal, May 2.

The coagulating power of heat in hot water has been turned to good account by Dr. Wyeth, in the injection method of treatment for nævoid growths, which he has devised and published in the New York Medical Journal for January 3, 1903. The following history is the report of a case in which I employed the method with good effect.

CASE.—A. B., an infant girl aged seven months, was brought to me early in January, 1903, for consultation regarding nævoid growths, one situated upon the crown of her scalp, the size of a silver half-dollar; the other, upon the end of the nose, outlined by that organ's limits and extending out from the tip.

The growths were congenital (maternal impressions, however, were not brought forward as the cause), painless, and pulseless. That upon the scalp was red and presented a granulated surface. The nose growth was pale and bluish in color, excepting when exposed to the chill air of the season, when it became of a bright, rose-red color, with dilated capillaries which continued until reaction of warmth caused the engorgement to disappear. As both areas were growing, it seemed advisable to attempt some form of radical treatment. Owing to the location of the marks, that of the scalp extending partly over the anterior fontanelle and that of the nose affecting decidedly the contour of the face, I decided that hot water injections were preferable to either excision or ligation. Accordingly, I commenced treatment of the scalp mark, after cleansing the area, by peripheral injections by means of a sterilized hypodermic syringe and needle of sterile water at a

temperature of from 180° to 200° F. One fluid drachm was injection without the aid of any anæsthetic. Reaction was manifested by distention of the mark until it became a tense, blanched, cystic tumor, which was painful, though the child ceased fretting when put to its mother's breast. A few drops of blood and water followed withdrawal of the needle. A light, dry, fluffed gauze dressing was applied, with narrow, overlapping, thin rubber-tissue strips next the wound, and the mother was ordered to return the child for examination at the end of three days. At the second visit the mother reported that the child had fretted the first night, but was undisturbed thereafter. Upon examination, swelling was found to have almost disappeared, the area presenting a mottled appearance made up of white and purplish spots. There had been exudation, as shown by some crusting. Another injection of one fluid drachm of sterile, hot water was made at this time. But little pain was caused and oedema was less marked. Injections were continued, at intervals of three or four days, during the course of the subsequent two weeks, varying in quantity from ten drops to one fluid drachm. Further growth ceased after the first injection, and shrinkage, with flattening of the surface of the mark to the level of the surrounding skin, took place. Turning my attention to the nose area I injected ten drops into the center, from the needle entered at the side. Great delicacy was required in the manipulation. Blanching occurred, with swelling. Two subsequent injections were made, with the result that further development of the growth has ceased and the nose now presents a satisfactory outline. In neither instance was the skin-surface damaged by the heat of the injections. The growth upon the scalp was the capillary (arterial) nævoid development; that upon the nose partook more of the nature of the venous type.

The chief danger following the employment of this method of treatment is that of embolism, but the tendency seems to be overcome by having the water near the boiling point when injecting, thereby insuring prompt and firm coagulation.

Hot Water in Eye Diseases.

Willis O. Nance (Medical Standard) states that heat is indicated in degenerative corneal processes, iritis, cyclitis, muscular spasm, "black-eye," and to hasten absorption of extravasated blood. It is best applied by means of moist pads, at the highest temperature (110-135° F.) the patient can endure, for a period of fifteen minutes, at intervals of two or three hours for many hours. Hot applications greatly assist the rapid absorption of various ophthalmic medicaments, when used just before the instillation of such solutions.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

Answers to Correspondents.

It is very gratifying to observe the interest manifested by many readers of THE JOURNAL OF ADVANCED THERAPEUTICS in the subject of the psychic treatment of disease. So many letters have recently been received from various parts of the country containing inquiries that substantially all point in one direction, that it has been deemed advisable to attempt a general answer in these columns. It must, however, be necessarily brief, and because of this, somewhat dogmatic.

Where does the practice of psychic therapy differ from that by ordinary or material therapeutics? At the very threshold! All material therapy aims at overcoming by the agencies at its command, physical deviations from normal action or conditions in the human body. It endeavors to remove obstructions from the pathway towards cure without necessarily concerning itself with the removal of the real cause, which is believed not to be physical or material. In other words, it seeks to relieve the bodily effects of deficient *vis medicatrix naturæ* without endeavoring at the same time to stimulate that to greater intensity. Thus the work is only half done and, as I firmly believe, the larger and more important part is left wholly untouched. It cannot be reached and stimulated by material agencies for it is in itself of a character and quality that does not respond to such stimuli.

We do not cure disease by drugs or electricity; we only assist Nature—the *vis medicatrix naturæ*—to evolve a cure! Physicians recognize the tendency of all acute disease towards recovery. Without this tendency, how utterly fallacious would be all attempts at cure? If, therefore, disease tends spontaneously towards recovery, what are physicians doing when they administer drugs or electricity? Stimulating this “tendency”—the *vis medicatrix*—to greater intensity and so enabling it to overcome the physical expression of abnormality denominated disease? I think not. It is rather an attempt to remove obstructions from its field of operation so that it may continue its work without embarrassment. Obviously more needs to be accomplished. Psychologists believe and *know* that more is possible.

Life is continuous. It existed before the birth of the physical body and will continue after its demise. Nature's lessons are highly instructive on this point. If a tree is struck by lightning with sufficient force to destroy its roots so it is no longer an efficient conductor of the current of life, the *vis* is withdrawn from that particular tree, and it dies! But not the smallest particle of life has thereby been destroyed,—only one of its avenues of conduction.

What is the human body with its nerves, ganglia, plexuses and muscles but a receiver and transmitter (transformer also, if you please) of a force generated entirely outside of itself? In its normal condition, it is a conductor of *vis medicatrix* whose province is both initiative and protective. But the body as such, neither initiates nor preserves. The force that does that is not of material origin or nature. Why should we expect to successfully appeal to it, then, through material agents?

Respiration, circulation, diapedesis, etc., during fully a third part of our lives, are carried on independently of the physical senses. We breathe and otherwise functionate, while we are asleep. If everything in and concerning the body, is material or physical, what is this force that carries on and preserves life when the body (including the brain) is lost in unconsciousness? Psychologists have designated it by various names. Whether it is called the "involuntary mind," the "sub-conscious self," "subjective consciousness" or the "sub-liminal self," is of no consequence so long as the fact of its existence and operation is recognized.

Psychologists contend that this "subjective consciousness" is the reservoir of the *vis medicatrix*; that unopposed by the objective self, it has power to perfectly control every organ and function of the body precisely as it sustains the involuntary functions during sleep. But they also contend that it is constantly amenable to suggestion, good or bad, from the objective self, and that its powers may thereby be enhanced or abridged. Obviously, in all disease, the life current or *vis medicatrix* needs to be appealed to or stimulated simultaneously with the attempt at the removal of the obstruction as expressed by abnormality in the physical body. Thus far there is substantial agreement. I think, among psychiatrists.

How this appeal can be most effectively made to the subjective self, does not admit of the same unanimity of agreement,

however. Many psychiatrists attempt it wholly through physical means, (or think they do) by verbal commands or suggestions. Thus they materialize their psychic methods and, in my belief, greatly curtail the measure of their successes. Nevertheless, they do succeed to remarkable degrees, but only because cotemporaneous with the vocal utterance, there escaped from their subjective faculty the impalpable telepathic message which reached and stimulated the subjective faculties of the recipient to greater activity. Already the trail of the serpent of materialism is to be discerned in the attempts to square everything within the possibilities of psychic therapy, by the miniature rule of hypnotism. Hypnotism is the least valuable of any of its steps, and its more useful purpose is in the glimmerings which the hypnotic state throws back to us of the possibilities that are wrapped up in the subjective consciousness. The highest and best psychic therapeutic work is to be attained without it. Here, then, is the difference between the psychic and material side of therapeutics. The one appeals to the source of life,—the *vis medicatrix*—while the other fights deviating matter solely with matter and endeavors to thus overcome its erring tendencies. The psychiatrist would not ignore material agencies any more than he would forget the source of all curative power. While seeking to remove through material agencies the obstruction as expressed in disease, he at the same time makes his psychic appeal to the subjective self where alone is lodged the power which, if actively operative, makes physical abnormality impossible.

Those physicians who care to pursue the subject, should study it in detail—study it as they would any other important branch of medicine or surgery. There are a number of excellent works on psychology that may be studied with advantage. But let the student be careful what he reads! This caution is believed to be necessary when the printing presses in every direction are busy in turning off a mass of rot and rubbish, for the most part, under the catching title of “The New Thought.” It is mainly a very old thought and pursued for purposes of “revenue only.” The progress of psychiatry in medicine has no greater foe than this kind of alleged psychic literature. Much of it is the veriest twaddle and most of it is absolutely valueless to a scientific mind.

Among the best books on the subject and which may be read

always with profit, are James' Psychology, Schofield's "Force of Mind," Olston's "Mind and its Privileges," and Hudson's "Law of Psychic Phenomena." These are all interesting and able works and they expound the basic principle of "plurality of consciousness," a clear comprehension of which constitutes the necessary starting point in the consideration of the psychic treatment of disease. While these books are cordially recommended, it should not be understood as an absolute endorsement of the several positions assumed by their authors on every phase of the subject. Personally, I have not been able (in practical investigation and application extending over a good many years) to follow any of them *exclusively* either generally or as to details. They have all stated much truth, but not any nor all of them have stated *all* of the truth. There is much that individual experience has demonstrated as true that has not found a place in any work thus far published within my present knowledge. Because of this and with a sincere desire to contribute to the symposium of knowledge on this important subject, the editor of this department has now in course of preparation, a work on "Clinical Psychiatry" which he hopes will be ready for publication early in the ensuing autumn.

M. F. P.

MECHANICAL-VIBRATION THERAPY.

EDITED BY LUCY HALL-BROWN, M. D.

The Successful Treatment of a Case of Complete Hemiplegia By Mechanical Vibratory Stimulation. By George I. Rochelle, of New York City.

The following case is selected for report mainly because it strikingly illustrates the benefits attendant upon the application of deep stimulation to the spinal nerve centers and the lymphatics. Aside from the interest which it is hoped a brief description of its history and treatment will afford, the case is valuable to the vibration-therapist as showing the far reaching effects upon organs and functions from the simple application of this important therapeutic agent to the controlling centers of the body.

History.—J. D. Age fifty. Occupation: Manager of a department in a down-town wholesale house.

For about twelve years preceding the cerebral attack about to be described, patient had been a pretty confirmed sufferer

from insomnia, and general impairment of nervous forces. His general nervous condition was bad.

On March 17, 1903, he had an attack of cerebral hemorrhage with right hemiplegia. The hemiplegia was complete, involving ptosis, the lingual organs, and the bladder, as well as the extremities. There was absolute inability to void urine without the use of the catheter. Muscular action sensation on the entire right side was abolished. He was practically incapable of locomotion to any degree.

Chemical analysis of the urine disclosed the presence of albumen in large quantities. While a quantitative test was not made, it is fair to assume that the urine contained at least fifty per cent. of albumen in the earlier examinations.

Treatment.—With a view of producing absorption, the usual drug treatment by the iodides was begun (with massage of the muscles of the affected limbs) and continued until April 23. As the patient was not improving and was becoming impatient and wished a change of treatment, I decided to try vibratory stimulation. He was carried to my office on the date above mentioned, and mechanical vibratory stimulation was applied between the transverse processes of the entire spinal column and to the lymphatics of the axilla and of the cervical and inguinal areas. It was repeated every other day.

Results of Treatment.—Patient claimed to have experienced relief after the first treatment, of certain sensations, on affected side, of a painful character. Was less nervous and slept better. After the second treatment, was able to pass a few drops of urine without using catheter. At the end of the fourth treatment, free and voluntary urination became re-established and the further use of catheter was unnecessary. Although patient had to be brought to my office for his first treatment,—being unable to get there unassisted, at the end of two weeks he was able to come and go alone, the walking being attended with scarcely any discomfort. Analysis made April 27, showed urine absolutely free from albumen, and subsequent examinations have continued to fail to disclose any trace of it.

On May 22d—one day less than a month from the initial treatment by vibratory stimulation—patient has perfect bladder function, normal action of kidneys, ptosis has disappeared and he uses his arm and leg freely. Except for the continuance of a slight limp when walking, he may be said to be now as well as before the original cerebral lesion.

We all recognize the tendency in acute disease towards recovery as a natural process. We also recognize the slowness ordinarily, of absorption of the clot consequent upon an effusion into the brain. Still more, we know how very tedious the process of regaining muscular control and action of the affected limbs is even after we have reason to believe absorption has been fully accomplished. I said at the outset of this paper that

this particular case was reported because it illustrated what may be designated as the manifold benefits accruing from the application of this treatment to controlling centers.

Let me epitomize somewhat. Here was a patient in bad condition for a dozen years prior to the inauguration of the brain lesion. He certainly was not a good subject for rapid recovery through the natural process of repair. It is well recognized that the rapidity of absorption in all parts of the organism is determined largely by the degree of the pre-existing neural and physical vitality of the patient. The same is substantially true in reference to regaining inhibited muscular action. It cannot reasonably be assumed, therefore, that this patient's recovery within so remarkably brief a time—much less than could be expected in the case of a previously healthy man—was due essentially to anything other than the treatment he received, especially so inasmuch as he failed to improve under the iodides and massage and not until vibratory stimulation was employed.

It being conceded, then, as I think in all fairness it must be, that the rapidity of the recovery was essentially due to the treatment given, it is interesting to observe the factors in the process. Mechanical vibratory stimulation was applied to the deep spinal nerves and to the lymphatic glands. What resulted? Evidently (1) the more rapid absorption of the brain clot; (2) the removal of nerve and muscle inhibition on the affected side; (3) the prompt re-establishment of normal functioning as seen in the disappearance of albumen from the urine and the resumption of free urination; and (4) the absorption by and elimination through, the lymphatics of the detritus or morbid products consequent upon the temporary inhibition of secretory organs and perversion of their metabolic functions.

BOOK REVIEWS.

THE PREVENTION OF DISEASE. In Two Volumes. By Many Authors. Translated from the German by Wilmot Evans (Funk & Wagnalls Co.). \$3.75 per volume.

The extent of the subject of preventive medicine, by no means new to the scientist interested in this line of work, is little known to the profession at large. So careful a compilation of the subject as is presented in these two volumes cannot fail to popularize the science with great benefit to the professional man and laity. The various departments are compiled by men who are masters of their subjects. The style is clear and concise. Even a simple perusal of the book will give a wealth of information to the reader, well repaying his time and labor. One must read the book to comprehend how important is the subject, and how it reacts on the practice of medicine. The first chapter

in Vol. I. "The history of the prevention of disease makes really interesting and profitable reading. I quote a few lines from the second chapter on "General prophylaxis."

"Medical prophylaxis is accordingly a special branch of hygiene. It is the sum total of medical counsel and rules intended to protect the individual from disease. In this sense medical prophylaxis guides the individual through the entire course of life from the cradle to the grave."

The books are clear in print, not too massive in size and handsomely bound.

H. G.

SOCIETY MEETING.

THE CLINICAL SOCIETY OF THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

Stated Meeting, May 15, 1903.

WILLIAM BENHAM SNOW, M. D., CHAIRMAN.

Treatment of Constipation. Dr. Watson L. Savage read this paper.

Discussion.

Dr. Edward D. Simpson: I regret that I did not hear the whole paper, for I was deeply interested in what I did hear. It was so full and explicit that I do not see how fault could be found with it. Mention has been made of the difference in the way in which women and men respond to the treatment, and I think here comes in the question of "suggestion." My own experience has led me to believe that constipation is a symptom, one of a symptom complex which, if not relieved, tends in many cases to produce that other symptom complex which is called neurasthenia. The cure of constipation in itself carries with it the cure of dyspepsia, the lack of the power of attention, more or less loss of memory, periodic headaches, brain fag, and many other well-known symptoms which bother the physician in his every-day work. My experience has shown me that the majority of persons coming to the physician do not drink enough water. We get rid of about six pints of water daily, and we do not make good this loss from the food. In using suggestive treatment in cases of constipation, I believe this form of therapy to be almost a specific for almost every case of constipation not dependent upon mechanical obstruction. I insist that the patient shall take small quantities of water, and, after a time, along with the sipping of water there must be the

accompanying thought of the physiology of the act—of what the water is doing. The water is referred to as giving proper fluidity to the secretions and to the blood, so that nutrition can be carried on properly; as a stimulant to the cells, and as a carrier of waste products from the body. Such suggestion I have found efficacious, not only in the removal of the constipation, but of the dyspepsia and the other symptoms enumerated as being associated with the constipation. In many instances the bowels will move after the first treatment; in many others they will not move regularly until after the third or fourth treatment. In the majority of cases a permanent cure will result in from four to six weeks of treatment, given three times a week with self-treatment in between, according to directions. Where the orders are not obeyed, and laxatives and cathartics are used, the good result is indefinitely postponed. If the patient has confidence in the physician, and will co-operate with him intelligently, the results are sure and satisfactory. By disobeying the instructions and taking a laxative the treatment is stopped, and often has to be begun over again, because the force of suggestion has been lost.

In one case narrated in the paper, it was evident that a cure was effected in a year, the patient having kept up the home exercises during that time. There comes in here the potency of suggestion. In this way the physician is building up the auto-suggestions, and they will automatically carry out daily those habits of life which maintain health. The trouble with cures effected by drugs or other methods unaccompanied by suggestion, is that the patient has not learned at the same time how to keep well; the patient continues to lean upon the particular thing. The physician who is successful in this line, must make a leader and not a leaner of his patient. In my references to suggestion I have not alluded to hypnosis, for, I believe this does not exist; I have referred to suggestion given in the relaxed condition. When used for a time it excludes the environment of the senses with the exception of hearing. In this condition the patient is in no sense unconscious of the environment, but the entire attention is fixed upon what is said. This is what I claim constitutes suggestive therapy. I maintain that the moment you obtain the complete attention of any patient, that person is hypnotized up to the fullest extent. If there is a so-called first stage, it is entirely subjective.

Dr. Cohen: Dr. Savage has impressed upon us one point in the treatment of constipation by physical exercise, *i. e.*, exactness in the treatment. This is a very important one, because no matter what the kind of treatment, whether electricity, massage, or exercise, everything depends upon the method of using it. This explains why Dr. Savage has such splendid results.

It is most important, of course, that we should make the cor-

rect diagnosis. We have been told that constipation may be caused by a great many diseased conditions, even from disease of the brain, or of the spine, as in locomotor ataxia. Exudations in the pelvis and retroversion of the uterus are other common causes of habitual constipation. Such constipation, therefore, has for its cause an atonic condition of the muscles of the bowel. This atonic condition may be either primary or secondary, though, for the most part, it is secondary to other atonic conditions in the intestinal tract—in fact, there is hardly any disease of the stomach which will not be more or less complicated by diarrhea or constipation. I have had patients come to me complaining of constipation, and on examination I have found no acid and no rennet in the stomach, a condition known as achylia gastrica, the symptoms of which are all referred to the intestine and not to the stomach. Of course it would be foolish to treat such a patient for constipation. There are other patients suffering from enteroptosis or Glenard's disease. Here the liver, the kidneys, and the stomach are falling down. I have here two cases illustrating this disorder. One of the patients is a lady of seventy-three, who is suffering from very obstinate constipation, and cannot have an evacuation from the bowel for something like two weeks at a time. Because of this she was afraid to eat, and because she did not eat she could not have regular motions, and in this way a vicious circle was established. The major curvature of the stomach was found about three-fingers' breadth below the navel. The liver was situated about four-fingers' breadth below the normal level. Treatment by electricity, bandage, and diet has resulted in considerable improvement. The other patient, also a lady, has almost the same symptoms. At the first examination it was found that the major curvature was below its normal level, and that the liver and kidneys were also prolapsed. She was treated by diet and by electricity applied directly to the stomach. She has improved so much that the stomach is now near the navel. Other cases might be mentioned to show the great importance of an accurate diagnosis, and how great harm may be done if treatment for constipation alone is employed. I recall the case of a man who was obstinately constipated because he had a diverticulum of the œsophagus, and as he could not eat he was necessarily constipated. An operation was done in his case. In the treatment of constipation we must remove all of the bad habits of such individuals, for instance, not answering the call of nature at the right time, reading while at stool, not drinking enough water. A person should drink at least eight glasses of cold water during the day. Patients who are accustomed to a very concentrated diet and who do not take coarse food suffer from constipation for the reason that there is not left a sufficient residue in the bowel. On the other hand, too much coarse food may be eaten, and in this way exhaust the muscles of the

intestine, thus giving rise to constipation. Physical therapeutics I have employed for the most part in the form of electricity. I have used chiefly the static induced and the wave currents, and have had splendid success with this treatment. I have also employed vibration therapy, not only by itself, but in connection with the electrode placed in the rectum. Dr. Achilles Rose has recommended the use of carbonic acid gas in the rectum, and claims that it is efficacious. I have made use of air for this purpose, and have found that it stimulated the intestine. I have also employed hydro-electric therapy. There is still another treatment which I have not referred to, *i. e.*, the rolling of a cannon-ball over the abdomen. It is capable of giving good results.

Dr. Maurice F. Pilgrim: When I first began the use of vibratory treatment I was surprised to have patients tell me that their constipation has been relieved. This led me to study the subject in the books on physiology, and I found that Kirke and Foster threw some light on this subject. I have applied the treatment, therefore, over the fourth and fifth lumbar nerves and over the vagus, and I have never found any other treatment which gave such good results. I think we will all admit that there is a nerve center in the spinal column governing defecation, because we have many high authorities in physiology who make this statement. I have never treated a case of constipation yet in the way just mentioned without getting some benefit, but the question of cure depends much upon the time. The topic has been so thoroughly presented from the side of suggestive therapy that I shall not touch upon that.

Dr. Savage: Perhaps I did not accentuate sufficiently the use of water, although I did say that I advocated the free use of water during the day, and especially in the morning, when one glass, or preferably a pint of water, should be taken. Suggestion is certainly an important factor, although I did not speak of it in that way in my paper. I have not worked with the vibratory machines, but I am willing to believe that they are useful from the fact that many forms of exercise act in much the same way upon the intestinal tract. I know that they improve assimilation and increase the intestinal secretions at the same time that they improve muscular tone of the bowel, and therefore, peristalsis. I believe the exercise is essential to final and permanent cure. I have not found it necessary to keep up the exercises after the bowels have been completely regulated. One of the cases reported did so, but I do not consider it at all essential. The exercises are usually given for about half an hour at a time.

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ON THE ADMINISTRATION OF STRONG GALVANIC
CURRENTS TO PATIENTS.*

BY ROBERT REYBURN, A. M., M. D.,

Dean and Professor of Hygiene and Preventive Medicine, Med. Dep.,
Howard University.

When the physician determines upon the administration of the galvanic currents to his patient, his task is comparatively easy when he uses only weak currents (such, for instance, from one up to ten or twenty milliamperes).

When, however, as in the case of fibroid tumors of the uterus, he gives from fifty up to two hundred and fifty milliamperes, he must exercise some care, to avoid alarming or injuring his patient.

The first requisite is a good battery. The battery generally used for giving the galvanic currents may be either one of the modifications of what is known as the Le Clanche cell, the dry cells, or the bichromate of potash cells.

The electro-motive force of the Le Clanche cells will average about one and a half volts. The dry cells are somewhat stronger, and the bichromate of potash cells will each give an electro-motive force of nearly two volts. Forty cells of the Le Clanche type will give a current strong enough for almost every use of the physician.

In practice I have found that two dry cells are equal in electro-motive force to two and a half of the Le Clanche cells and two of the bichromate of potash cells are equal to three cells of the Le Clanche type.

All varieties of galvanic cells (except the dry cells) are troublesome, and require careful supervision to keep them in order. For those who cannot obtain the electric street current,

* Read at the meeting of the American Electro-Therapeutic Association, at the Hotel Kaaterskill, Sept. 3, 1902.

such as is used for incandescent lamps and other domestic purposes, the dry cells are decidedly the best.

They furnish a strong current, always available, and can be renewed when exhausted for very little more than is required to charge and fill the Le Clanche cells.

The street current for incandescent lighting is par excellence, the current for the physician, and no one who can obtain it will ever thereafter voluntarily abandon its use.

Assuming, therefore, the physician has at his command a satisfactory and efficient electrical current, the other two requisites are a good rheostat and a correct milliampere meter.

The electrodes used vary largely in material as used by different physicians. They are, of course, composed of metal, which may be either copper or brass, wire, gauze, tin, sheet lead, etc., which are either filled with clay, as in Apostolis' method, or covered with canton flannel or towels wet with salt solution.

For several years the writer has abandoned the clay electrode as being too messy and troublesome for office use. The electrodes he uses are composed of coarse brass wire gauze, which, during use, are covered with towels saturated with a strong solution of common salt.

The advantages of these electrodes are, that they are cleanly, and the towels can be readily sterilized by boiling, so as to have them clean and aseptic when next required for use.

Having had one or two cases of metritis and para metritis following the use of Professor Apostolis' method of intra-uterine puncture by the pointed electrode, he has also abandoned its use.

The chief point to be observed in giving strong currents is to use as large electrodes as possible. The reason for this is obvious, when we reflect that increasing the surface of the electrodes diminishes the intensity of the current (where it is in contact with the body in proportion to the square of the surface). In other words, if we have an electrode of one inch square, it will transmit a strong current, with a strength sufficient to irritate and perhaps necrose the part of the skin or body to which it is applied. If we increase the size of the electrode to 4x4 inches, the strength of the current will be only one-sixteenth of the intensity, and hence will be harmless to the tissues.

But electrodes such as 4x4 are far too small for the appli-

cation of strong currents. The smallest used by the writer in such cases are 5x7 inches, or 35 square inches, and the largest measures 9x15 inches, or 135 square inches, in surface.

In the first seance with a patient with fibroid tumors, always give a mild current, not over forty or fifty milliamperes. In subsequent seances you can gradually (after having acquired the confidence of the patient) increase the strength of the current until you reach the maximum of one hundred and fifty to two hundred and fifty milliamperes.

You will find also that it will be better to turn on the current gradually, and not turn on the maximum strength at once. Commerce, for instance, with a current strength of fifty milliamperes, and after a few minutes turn on fifty or a hundred more and gradually increase it.

The same differences between patients you will find in the administration of electricity that you will find in the cases of the administration of medicines. Some patients, either from idiosyncrasy or of a neurotic type, will never be able to be subjected to as strong currents as others.

A little tact and suavity will serve a good purpose in these cases, and by them you will usually be able to manage them successfully.

The most of my experience with strong galvanic currents has been in the treatment of cases of fibroid tumors of the uterus.

While this method of treatment is tedious and laborious to the physician, yet, as far as the patient is concerned, it seems to me to have marked advantages over the use of the knife.

In the first place it is aseptic and absolutely devoid of the dangers that will in a certain per cent. of cases inevitably follow the removal of these tumors by surgical operation.

Secondly, in case the treatment is unsuccessful, it does not prevent or render any more dangerous the subsequent use of the knife, but in the great majority of cases it renders the use of the knife unnecessary.

Nothing can be more gratifying to the physician than to see the gradual subsidence and atrophy of these fibroid tumors by the continued use of strong galvanic currents.

While the tumor may never entirely disappear, yet the patients are symptomatically cured, the hemorrhages disappear, and the patients are relieved from a condition of chronic invalidism and are restored to a condition of comparative health and usefulness.

NEWMAN'S PORTABLE GALVANIC BATTERY*.

BY ROBERT NEWMAN, M. D., NEW YORK.

This portable galvanic battery was designed by the writer some years ago for the particular purpose of having a suitable apparatus for electrolytic use that could be transported on any conveyance without fear of spilling the fluid.

The particular features of this battery are:

- (1) All parts of the battery are visible, and easy of access.
- (2) It can be transported any distance by wagon, railroad, or any other conveyance, without the fear of breakage, or any disarrangement.
- (3) The cells are empty in transit, and are only filled at the place of operation; a concentrated fluid is carried in a closed bottle, and kept in the center in the dripping tray. When wanted, the fluid is diluted and the cells filled. After the operation the battery fluid is thrown away, the elements are cleaned by immersing into the dripping tray containing water, and an empty battery is taken home. The small expense of the fluid cannot be taken into consideration under the circumstances.
- (4) A small screw driver is all that is needed to adjust or replace any element which may be broken by an accident, and thereby the service of an instrument maker is avoided.
- (5) The dripping tray is a feature, in which the elements are placed and cleaned after each use, preventing any crystallization of such elements and keeping them useful a longer time. During transit, this tray is useful as a safe reservoir for auxiliaries, and fluid in a bottle.
- (6) Under these circumstances there is no spilling of fluid, and consequently no destruction of any fabric directly or indirectly.
- (7) One-half of the battery, or one section of ten cells, may be used independently, without the other ten cells being filled with the fluid, thereby saving the zincs as an economical measure.
- (8) The weight of the apparatus is light; the size reduced; thereby facilitating transit.

* Read at the Twelfth Annual Meeting of the American Electro-Therapeutic Association, September 3, 1902.

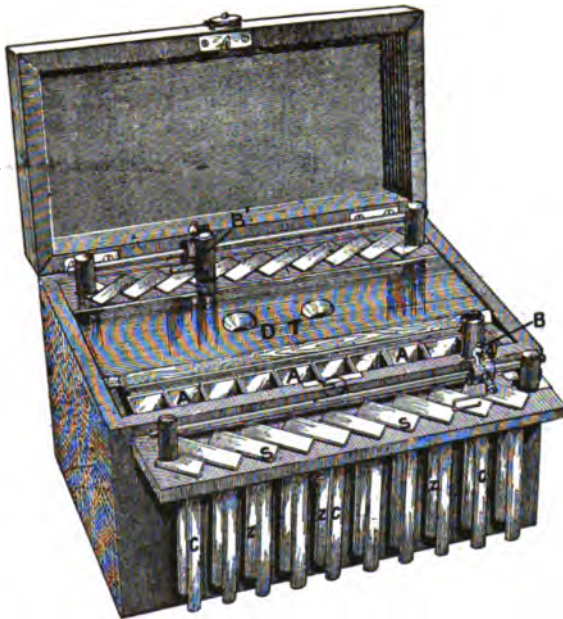
(9) The price of this battery is lower than any similar battery, and it is sold for \$20.00.

New improvements are particularly:

(10) More simple in construction and working.

(11) The increase and decrease of the current by single cells is made by a sliding spring, which prevents any interruption or unsteadiness of the current, and the management of it is easier, being made with one hand.

With care the battery can be carried filled with the fluid short distances, to be used in the neighborhood. Any other



A A A, Hard Rubber Cells, 20; *B*, Binding Post for the Positive Pole, Front Row; *B1*, Binding Post for the Negative Pole, Rear Row; *C*, Carbon Elements for the Connection of the Cords; *Z*, Zinc; *D. T.* Dripping Tray.

attachment needed, as a milliampere meter, can easily be brought in the circuit, and a rheostat is not needed. Each cell has an E. M. F. of $1\frac{1}{2}$ volts, and a current of nearly one milli-ampere.

The resistance varies according to the size of and distance of electrodes from each other, and thereby alters the strength of the current.

The durability of the battery and its simple mechanism particularly for electrolysis are obvious. The attention needed to keep the battery clean cannot be called an objection.

The instrument has been manufactured for me by the Jerome Kidder Manufacturing Co., New York City.

Discussion of Portable Apparatus of Reyburn and Newman.

Dr. G. Betton Massey said that bichromate of soda was better than bichromate of potassium, because the former was less destructive to the carbons. The battery exhibited he thought would give as much current as would ordinarily be required for electro-therapeutic work except in the treatment of cancer. The battery could even be used for lighting a diagnostic lamp for a few moments. The simplicity of construction, the zinc and carbon rods, were to be highly commended.

With regard to the difference in the electrolytic action obtained from a current from cell to cell and from the use of a rheostat, he thought that the only difference was in the effect of an interruption. With two milliamperes, for example, from four volts, an interruption of a certain amount of resistance would not be as great as if a big resistance had been inserted with twenty volts.

Dr. Robert Reyburn said that the dry cells used in his apparatus are guaranteed for three months, but they would often retain considerable power for a much longer time. With ordinary use, he thought, they could be used for at least six months, and the advantage was that there was no handling or leakage of acid. The galvanoscope could not be used further than thirty or forty milliamperes, because the deflections of the needle become too small. The great objection to the rheostats employed ordinarily was that there was apt to be a break; whereas, with his portable rheostat this did not occur, and its action was very smooth and satisfactory.

Dr. Robert Newman said that the remarks of Dr. Massey were very much in order. According to his experience there was a difference in the electrolytic action obtained from a few cells and from a larger number of cells used in connection with a rheostat. It would be well to make a series of exact experiments on this point. In his work there must be no interruption, and the amperage must be gradually increased from zero and again reduced to zero before the current is broken.

X-RAY THERAPY.

BY WILLIAM L. HEEVE, M. D.

In our general practice we are often confronted with obstinate cases of skin diseases, which seem to resist all known medication. It is in these very cases that the X-ray seems to possess curative properties. The analgesic effect is immediately noticed, relieving the itching and irritability, and giving the patient confidence in the treatment.

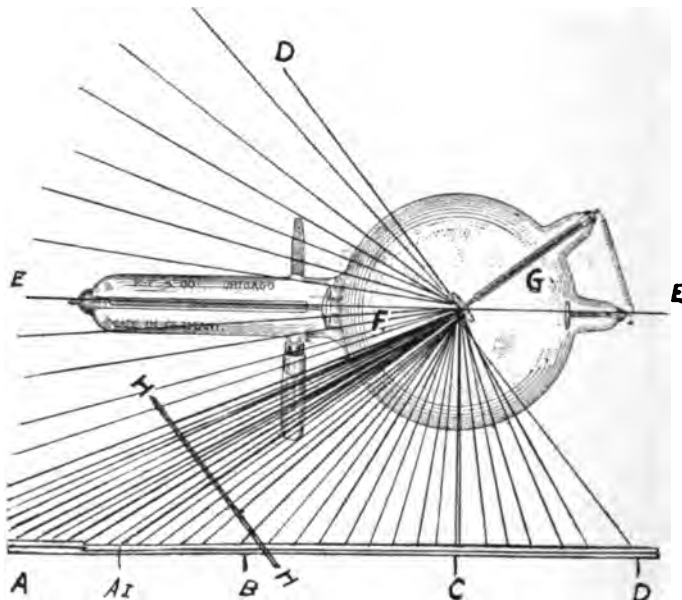
The results obtained from the use of the X-ray in my practice have been so gratifying that I can safely predict a more general use of this therapeutic agent in the treatment of many indolent forms of skin disease.

It has been the experience of the writer that a low tube—one showing a well-defined image of the hand upon the fluoroscope—will produce quicker results than a higher tube. With a low tube of this test we can easily raise the vacuum, and increase the degree of penetration, according to the depth of tissues involved, by inserting within the circuit a multiple ball spark interrupter, the greater the number of spark gaps the greater the degree of penetration. The distance between each ball should not exceed $\frac{3}{16}$ of an inch.

A very important factor to be considered in raiadotherapy is the position of the tube in relation to the part to be treated. Many have neglected this all-important factor in this new field of work. The beginner, in most instances, will place the tube in such a position that the imaginary line drawn between the two terminals of the tube is parallel with the part to be treated, or the sensitized plate, considering that the rays are projected *in maximum* in a perpendicular direction to the horizontal line between the terminals, from a point where the anode bisects the horizontal. This is an error, as the nearer we get to the lower division line between the dark and light hemispheres, the less active are the rays.

The cathode rays, as they bombard against the anode, are reflected in greatest volume in a perpendicular line from the point which immediately becomes red on the anodal plate of platinum, and we must place our tube in such position that the perpendicular line drawn from the anode bisects the part to be treated or photographed. The truth of this assertion can easily

be proven by the following experiment: Take a 4x5 plate, and place it eight inches from the tube in parallel with the horizontal line between the terminals, allowing the rays nearest the lower end of the dark hemisphere to act; take another 4x5 plate, and place it eight inches from the tube in a parallel position to the horizontal line of the anode, allowing the perpendicular rays from the anode to act. Be careful and place this plate



A-B, Area of most active rays or proper field of radiography; *A1*, Perpendicular line from anode or center of field of light hemisphere; *B-D*, Usual field taken; *C*, Perpendicular line drawn from horizontal line between both terminals; *E, E'*, or improper center of active field; *D-D*, Division line between the light and dark hemispheres; *F*, Light hemisphere; *G*, Dark hemisphere; *H-H*, Proper position of a photographic plate-parallel to the anode.

in proper position. Place the right wrist on one plate and left wrist on the other plate, light up the tube, giving under-exposure—2-3 of time necessary for normal exposure—develop both plates in same tray, giving each same time, and fix. Now compare the shadows produced by the carpal bones on both plates and you will prove that the perpendicular rays—the rays coming from the direct center of the light hemisphere—are most active. (See cut.)

The distance of the tube from the part to be treated should be from eight to fifteen inches, and treatments given twice weekly of ten minutes duration, until we are reasonably sure that the patient has no idiosyncrasies toward the X-ray. We can then begin treatment every other day, or daily, if possible. As soon as reaction has been obtained we can give treatments twice weekly; finally treatments may be given once weekly, to insure against recurrence.

The healthy parts are shielded by means of the so-called "tea-lead." In raying the back or chest, I employ a screen with diaphragm openings, large enough to allow thorough exposure of the diseased part.

I cannot accept the theory of, nor do I think that protection is gained by using paraffin and antiseptics to protect the healthy parts. Paraffin cannot retard the penetrability of the X-rays; nor do I believe that the rays carry the bacteria or floating matter from the air, and cause such matter to penetrate the tissues. Bacteria or foreign particles do not cause the dermatitis.

Case 1. Mr. Geo. C., age twenty-seven years; grocery clerk. Has been a sufferer from *acne vulgaris* involving the upper portion of the back, especially between the scapulæ, and over the sixth to ninth ribs. He has received medicinal treatment constantly during the past three years with apparently no success. Dieting had no effect.

After raying this case for three months, a cure was obtained. The only medicinal treatment was *cascara* and *nux vomica* internally, and cold douching before retiring. Six months has elapsed with no return of symptoms.

Case 2. Mrs. H. C., age thirty-six years. A case of hypertrophied scar-tissue, due to several abscesses of the glands of neck. The scar-tissue produced most excruciating pains. Medicinal treatment gave no result, surgical treatment was refused. Exposures were given three times weekly, using a low tube with six spark gaps of the ball interrupter in circuit. After three months' treatment of irregular visits the tissue became soft, and gave no further trouble, also decreasing in size.

Case 3. Miss A. V. C., age twenty-two years, born in Holland. Suffering from *lichen planus*, involving the forearm. She had tried the starvation, beef and milk diets, also vegetables, with no success. Drugs seem palliative only.

After fifteen weeks of X-ray treatment a cure was obtained. It is now eight months since the case was discharged as cured, with no return of symptoms.

Case 4. Willie K., age thirteen years. Case of ring worm on forehead, which resisted the usual remedies. Within three weeks a cure was obtained.

Case 5. Mr. Robt. McM., age thirty-two years. Case of eczema of back of hand, appearing in the form of moist orbicular patches of an extremely obstinate character. Tribromophenol-bismuth applied externally seemed to improve the condition, but a cure was impossible.

As a last resort the X-ray was tried. With the second application of the X-ray it seemed to increase the condition, but after the fourth application symptoms improved, and an apparent cure was obtained after twenty-two exposures of the X-ray. Four months has elapsed since the patient was discharged with no return of symptoms.

Case 6. Mrs. M., age thirty-nine years. Presenting a case of rosacea erythematous et pustular, involving the entire chin. This case may well be classified by the laity as the so-called "dyspepsia blossoms," and not "rum blossoms," as generally found. She has been a sufferer from atrophic catarrh of the stomach during the last two years. With a carefully selected diet she has managed to keep her face in a fairly presentable condition.

She suggested a trial of the X-ray, as she believed there was still hope to obtain a cure, which to my mind seemed very doubtful, owing to the condition presenting in the stomach.

August 14, 1902, she received her first treatment of X-ray, followed by daily exposures of five minutes with a low tube. August 21, reaction occurred showing a marked inflammatory state with an increased number of hard pustules, but giving no discomfort to the patient. The next treatment was given August 24, when all inflammatory symptoms had disappeared, and the part appeared better than ever. Further treatments were given twice weekly, of ten minutes duration. The last treatment was given October 4; the chin presented a tanned appearance. This patient called to consult me during January, 1903; the chin presented a slightly rough surface with a few pock marks formed by the healing process of a few large pustules, but the cosmetic effect and the disappearance of the un-

sightly disease of the chin produced a marked effect upon the patient; life seemed new, and ambition was restored.

Case 7. Mr. G. W. Developed an obstinate form of scaly eczema of the palms of both hands, while employed in a chemical factory. He was forced to resign his position and seek relief, but without good results. The usual remedies seemed to produce but temporary improvement. At my suggestion we tried the X-ray.

He received the first treatment October 4, 1902. Treatments were given twice weekly with marked improvement at once. After receiving twenty-four treatments he was discharged cured, and has remained so to the present time.

Case 8. Henry C. O., age thirty-six years; occupation, tanner; has suffered from psoriasis during the last twenty years; it was most severe during the winter months; involving the back and flexor aspect of the arms. Arsenic in various forms seemed to irritate, and made the patient feel uncomfortable. Chrysarobin and salicylic acid gave no results. His occupation forbids his close attention to the fundamental laws of hygiene.

Treatment with the X-ray began October 4, 1902, using a low tube with six spark gaps of the series ball interrupter. Distance of tube from the patient was about fourteen inches. Treatments were given twice weekly of eight to fifteen minutes duration. Treatment was discontinued November 14, owing to acute illness, and continued again December 18. During this interval improvement continued, and I was much surprised when the patient returned to find that the scaly eruption had almost entirely disappeared. Treatment was now given every other day, and the patient was discharged as apparently cured on January 10, 1903, and has remained so.

The cures obtained in the above cases open up a field for the X-rays, where the public can receive a great benefit therefrom. They are the first eight cured, in a series of skin diseases treated by the writer with the X-rays; the other cases of this series will be reported in the future, giving ample time for the classification of permanent cures. One case of *nævus vascularis*—port wine mark—and one of *nævus pilosus* received some benefit from X-ray therapy, but the action was slow and tedious, therefore discontinued. Both of these cases were eventually cured by the writer with electrolysis, using the gold

needle attached to the cathode. With the experience in the above two cases and six other cases of nævus, I believe we have a most potent remedy in the treatment by electrolysis, superseding the X-ray, in this malformation. Perhaps in large port wine marks we can use both methods with quicker results.

The object of the writer in reporting the above cases is not to advocate this form of treatment in all forms of skin diseases; far be it from the writer to advance such an idea, but to call the attention of his colleagues to this potent remedy in the *chronic* form of skin diseases, which have run the gauntlet of our usual medication without apparent success.

We have not yet reached the limit of X-ray therapy, nor can we estimate its limit at the present day, however we are justified in recommending the use of the X-ray in the treatment of all *superficial and inoperable cancers, lupus, obstinate forms of skin disease, and tubercular joint disease.*

Whether the X-rays will benefit tuberculosis of the lungs is still a disputed question. The writer has treated four cases, giving all the early symptoms of pulmonary tuberculosis, in three of which tubercular bacilli were found in the sputum after repeated examinations. These cases were given X-ray treatment, attention given to diet and hygiene. *Two cases have received an apparent cure*, the third discontinued treatment to obtain the benefit of the climate in New Mexico, but his letters indicate that he is gradually failing. The fourth case is much improved, and is still under treatment. In the fourth case no bacilli were found in sputum in the beginning of treatment, and but once since then a few were found.

The tube used in the above cases was excited by a ten plate (30 inch) static machine.

302 Sumner Ave., Borough of Brooklyn.

THE TREATMENT OF INSOLATION ON HEAT STROKE.

BY CURRAN POPE, M. D., LOUISVILLE, KY.

The necessity for the careful and prompt treatment of each and every case of insolation should be made plain, not only to the members of the medical fraternity, but to laymen. Tersely described, insolation consists of too great an accumulation of heat within the body which is precipitated upon the nervous system, where the greatest suffering is entailed, and the greatest danger lies. The first object of treatment should be to lessen the amount of pyrexia, and to prevent additional heat production. The causative factors in its production may be the direct effects of the sun's rays or radiations from blast furnaces or other methods of industrial enterprise where high temperatures are required. Radiations from metal objects upon which men are working I have observed to be singularly productive of heat stroke, as we have here a combination of two factors, direct and indirect solar radiations. As is well known, the presence of a large amount of moisture in the air is favorable to its production.

The writer has experienced intense heat upon the plains of Colorado and New Mexico with comparatively no discomfort, owing to the dry and clear atmosphere of these regions. It is much more apt to occur where severe physical exercise accompanies a high and damp atmosphere; thus we find that "the horny-handed son of toil," carrying his hod or wielding his sledge; laying a tin roof, or harvesting the hay; running a steam-engine, or firing a furnace, is much more liable to an attack than the citizen who sits in his office and takes his exercise under raised umbrella accompanied by palm-leaf fan. The ill-effects of heat are largely exhibited by symptoms referable to the nervous system and present different gradations, ranging from simple heat exhaustive conditions to the gravest forms of heat pyrexia. The seizure, as a rule, is accompanied by premonitory symptoms of a sense of fullness in the head, headache, vertigo, distress, a fullness in the epigastrium, a general sense of lassitude, weakness, dimness of vision, nausea, and later, insensibility. It should be carefully borne in mind that heat stroke is but a mild form of true thermic prostration. It has

always seemed to the writer that the causation was the resultant of increased production and diminished eliminations of heat, and a careful analysis of the symptoms certainly shows that there must be a serious interference with the regulating mechanism of heat production and elimination. I have always accepted the neurotic explanation of its causation. Thus Wood clearly and tersely says, "When a man is exposed to heat beyond his powers of resistance there is a gradual and slow rise of temperature until the stimulus of the heat becomes so intense as to paralyze the heat center and vasomotor nerves, as the case may be; with probably a sudden intensifying of the process of oxidation, accompanied by an overwhelming of the cerebrum."

Treatment: The first step in the treatment of heat stroke or heat exhaustion is the immediate removal of the victim from his surroundings to an atmosphere as cool as possible; he should be laid upon his back, and all the clothing loosened, especially any constriction around the neck and abdomen. Cold applications should immediately be made to the *head and neck* by means of wet, cold cloths or compresses. Nothing is better than a towel folded lengthwise, dipped in cold water, wrapped loosely around the neck, while cold water is applied to the head. The physician should be summoned at the earliest possible moment, and the case given over to his care. It is very much more efficacious to immediately apply the cold on the ground than to wait until the patient can be removed to some hospital. Much valuable time would be lost, and the patient's nerve centers endangered by this procedure. Where possible, it is best, of course, to remove the patient by means of an ambulance, to his home or hospital, applications of cold being constantly kept up, *during the trip*. Where the pyrexia or fever is very high, and circumstances do not permit the removal of patient's clothing, no attention should be paid to his personal apparel, but buckets of cold water should be poured over him from a distance of four or five feet, while several parties should rub his arms, legs, and trunk. The writer has seen a number of these cases, and *in no instance except in cases under his own care* has he ever observed the application of friction to the surface while applying cold water. The rationale of this procedure has been so often demonstrated in the application of the cold bath in typhoid fever, and all conditions of pyrexia, and

has so frequently been the subject of editorials in this department that the editor hardly feels the need of entering into a more specific description of its effects. It may be stated, however, that the application of cold accompanied by friction dilates the blood-vessels of the skin, draws the blood from the brain, favors heat elimination, and causes tonic contraction of the blood-vessels, at the same time powerfully stimulating the vasomotor system, and by reflex effects lessening heat production. The classic studies of Brandt, Vogl, Wood, Baruch, and others have time and again been proven by the treatment of cases under the writer's care. There is, however, no better demonstration of the advantages herein enumerated than is shown by the results obtained by Ellis, in his New York ambulance work.

When the patient reaches the hospital or home the clothing should be removed, and cold applications continued vigorously. If the circulation is bad, strychnia, strophanthin, or whisky may be administered hypodermically. When the temperature subsides the patient should be removed to a darkened room, preferably kept cool by an electric fan; and cold compresses or ice-bags applied to the head and neck, and he should be urged to drink freely of cold water. The emunctories should be thoroughly stimulated. Upon the slightest indications of a rise in temperature hydriatic measures should be adopted; either the pail dash, the Brandt full bath at 60°, or the cold pack repeated. The patient should be kept in the recumbent position for several days under the cold air blast.

The after-treatment is important. As the result of the heat stroke the patient's nervous system and vasomotor mechanism has received a severe and debilitating shock, and we often find lasting traces of injury to nervous functions, such as headache, vertigo, deafness, insomnia, nervous irritability, altered disposition, tender spine, indigestion; anæmia, irregularity of respiration and heart action, morbid dreads, mental excitability, mental depression, and an incapacity for standing heat or the action of the sun's rays. It is, therefore, essential and advisable that the patient be put upon a light diet; that he refrain from the eating of meat during warm weather; that he be compelled to drink, daily, at least one gallon of water; that all digestive conditions and constipation be corrected; and that measures be continued which will stimulate and regulate the nerve func-

tions, and place him physically and nervously in perfect condition. For this purpose institutional treatment should be commenced, and continued during the period of hot weather and long into the fall or winter. Nothing is superior in these cases to the careful use of the cold rain bath, and cold jet douche to the spine.

The writer has had the pleasure of seeing a number of cases entirely freed from the unpleasant sequelæ by the adoption of these methods. It has been argued that the application of these measures is troublesome, and requires too much time and attention of the physician and patient. It has always struck me that whatever is worth having in this life is never gotten without endeavor and labor on the part of the recipient, and were we to shirk all that is troublesome, many patients would have to go untreated and uncared for. It is an argument unworthy of its inception, and mentioned only to discredit.

Every large city in the Union has its quota of heat and sun strokes, and while each city has comparatively few, considering the population, still these cases during summer run into the thousands, taking the whole country.

Ambulances starting for these cases should be well supplied with water, ice, and an ordinary sprinkling-can, for, with this simple paraphernalia, great good can be done, pyrexia reduced, and much suffering averted.

MECHANICAL VIBRATION AS A PHYSICAL AGENT
IN THE TREATMENT OF DISEASE.

BY FREDERIC H. MORSE, M. D., MELROSE, MASS.

Ex-President of the American Electro-Therapeutic Association.

It ought never to be necessary for a *physician* to say that he is not an *exclusionist* in his therapeutics; nevertheless, in view of what it is proposed to set forth in this brief paper, it may be as well to state that what is herein offered is with no intention of having the physical agent commended, considered as a "cure-all." So far as my investigation and knowledge enable me to judge, there are none. Since giving mechanical vibration a place in my armentarium—and it was done gradually, and without any great expectations as to its ultimate accomplishments—its usefulness has steadily been demonstrated in the treatment of a large number of cases, and of a somewhat varied character. Anticipating very little at first, a widened experience with it has since led me now to expect very much from its employment.

It is not within the scope of this contemplated brief paper to attempt more than an outline of the conditions in which it has been found of incalculable service. Increasing experience in its use will doubtless suggest and demonstrate its usefulness in other directions. Up to the present time, its use either singly or in conjunction with other appropriate electrical treatment, has led me to value it very highly, *when applied locally*, in conditions of stasis, muscular contractures, inflamed (sometimes anchylosed) joints, some forms of benign tumors, particularly goiter; chronic conditions of the pharynx, chronic neuritis, and general muscular inhibition. When applied deeply to the spinal and sympathetic nerves, its power to stimulate general systemic processes has been found to be very prompt and satisfactory. Its action upon the vaso-motor is one of its greatest merits. Application to the nerves along the spinal column has not only induced an improvement in the general nutritive processes of the body as a whole, but has also favorably modified, when it has not actually controlled, various visceral derangements. Its analgesic action, when the vibration is applied to the proper centers, is one of its qualities upon which I am constantly coming to rely more and more as my employment of it is extended. As well supplied as I have always

felt that my office was with the latest and best electrical and other apparatus for the treatment of disease, I should now consider it poorly equipped without an efficient mechanical vibratory instrument.

As illustrative of the *possibilities* of treatment by mechanical vibration—because the time and space at my present command will not permit of attempting more—the following cases have been selected (from a very large number successfully treated) for report. It is hoped that they may prove sufficiently interesting to stimulate investigation of this method of treatment upon the part of those who thus far may be unacquainted with its merits.

GOITER.

Miss G. A., age nineteen; student. Has suffered for several years from enlargement of the thyroid gland (goiter), rapid and irregular cardiac action, and slight but distinct protrusion of the eye-ball.

Case was first treated bi-weekly with galvanic electric current, and vibration as an adjunct. After the sixth treatment, the combined treatment was discontinued, and vibration employed *exclusively*.

February 2, 1903, began treatment with mechanical vibration exclusively. The neck over the site of the tumor measured at this time $13\frac{1}{4}$ inches. Pulse 115 to 125 per minute. Two treatments weekly were given for a period of eight weeks, with the following results:

Neck measured 12 inches. Pulse reduced to 90, and greatly improved in character. Patient reports herself "much less nervous," and generally improved in every way.

Treatment was applied by means of the ball over the cervical region down to and including the third dorsal, a medium stroke being used. The lymphatics of the axilla were stimulated; and a long stroke was applied directly over the enlarged gland.

The case is still under treatment* once a week, with a steady improvement.

CHRONIC SYNOVITIS.

Miss G., age twenty; student. On July 2, 1901, patient sustained a bicycle accident, injuring the right knee joint. She was

* June 2, 1903.

confined to her room for over a month, suffering a good deal of pain, and unable to walk. When acute condition subsided, it was found there was impairment of motility, and apparently a slight effusion into the joint.

Patient was brought to my office in a carriage (being unable to walk) for treatment, February 10, 1903. Past successes with mechanical vibration in the treatment of analagous conditions, induced me to make a trial of it in this case. From February 10 to March 1, she was given three vibratory treatments a week. At the end of the ninth treatment, patient was able to walk to the office, and to resume attendance at school. From March 1 to April 1 she was given two treatments each week. On the date last named, lameness was entirely relieved for the first time since receiving the original injury in 1901, and it has not since returned. On May 10, the swelling in and about the joint has wholly disappeared, and the case is apparently cured.

Treatment was applied deeply over the front and sides of the affected joint, and mild stimulation to the muscles and nerves in the popliteal space. The lymphatics of the inguinal region of affected leg were also stimulated. Each treatment averaged in duration about ten minutes.

OBESITY AND CHRONIC CONSTIPATION FOLLOWING PELVIC SURGICAL OPERATION.

Mrs. H., age forty; weight 200 pounds; height five feet six inches. On September 10, 1900, submitted to a hysterectomy with removal of the tubes. Following this, patient has ever since been troubled with constipation, believed to be due to a partial paralysis of the intestines. Could not have a movement of the bowels without the use of cathartics. Was absolutely dependent upon them. The slightest exertion exhausted her. Sleep was not refreshing, and her most constant sensation was that of being tired. Digestion and assimilation were bad.

Electricity in various forms, as well as massage, had been given this patient without satisfactory results. There was a large accumulation of adipose tissue all over the abdomen.

January 19, 1903, patient was given her first treatment by mechanical vibratory stimulation. It was applied by means of the ball deeply to the spinal nerves, from the twelfth cervical down to and including all the dorsal and the first four lumbar.

Stimulation was applied anteriorly over the entire abdomen with the rubber brush, and continued for fully ten minutes at a time. Patient was treated twice weekly.

At the end of the tenth week of treatment—twenty treatments in all—patient's weight had diminished seventeen pounds; cathartics, which she had used continuously for nearly three years, were discarded as she now had one or more regular and free bowel movements each day; digestion greatly improved; a return of former energy and the complete disappearance of the lassitude and "tired" feeling which were previously such pronounced features of her case. Patient is now very buoyant and has discarded her "abdominal support" (bandage) which she had worn constantly ever since her operation, and which previous to the vibratory treatment, she felt she could not be comfortable without.

In conclusion, it should be said that the full possibilities of this therapeutic agent cannot be realized unless the treatment is applied by an *efficient instrument*—one capable of imparting deep stimulus to the deep nerves—and to the affected areas as disclosed by sensitiveness to spinal pressure. A working experience covering over several months has convinced me of the absolute accuracy and practical efficiency of the propositions expounded by our colleague in electro-therapeutics, Dr. Maurice F. Pilgrim, in his valuable little brochure on "Vibratory Stimulation." This book should be part of the working outfit of every physician beginning the use of this form of treatment. As to the choice of an instrument, individual preference will have to determine. But for myself, only the best—the one that by its rigidity of action imparts the greatest vibratory impulse *to the patient*—is satisfactory. For this reason I, some months ago, discarded a miniature vibrator,* so-called, which I had previously unwisely purchased, and procured one that not only generated more vibratory force, but enabled me to direct it into the body of my patient instead of partially wasting it upon myself during its application.

* One actuating through a flexible shaft.

PSYCHIC-THERAPY.

BY J. HOLCOMB BURCH, M. D.

Baldwinsville, N. Y.

That buried beneath the active consciousness there exists a subtle power capable of alleviating human suffering by purely psychic means there seems to remain but little doubt. From the earliest æons of human history, we find reports of most marvelous cures having been effected by various mental means. In the earlier ages, the healing of disease was supposed to be a power derived directly from God, and we find various priests and religious devotees practicing their own peculiar forms of ceremonies and incantations for the alleviation of human ailments. In fact, the healing of disease seems to have played a very import rôle in the history of all religious sects.

The Grecian and Egyptian priests caused the sick to lie in their temples where the God of health revealed in dreams the remedial agencies that they were to employ to restore their health. The religions of the East taught the subservience of matter to mind, using methods similar to those of the modern schools of hypnotism. The Christian religion contains innumerable examples of mental healing. Elijah is reported to have healed the dead child by stretching himself upon the body and calling upon the name of the Lord. Moses transmitted his power to Joshua by the laying on of hands. The New Testament contains most marvelous examples of psychic-therapy. In fact, the most wonderful of all psychic cures were wrought by Christ. He taught that the secret *lies in the faith to wield the innate power* that he proclaimed all men possessed. His disciples were taught to heal; and the history of the Church is replete with records of mental healing. Thus, St. Patrick is reported to have healed the blind by laying on of hands. St. Bernard restored, it is said, eleven blind and eighteen lame persons in one day at Constance. At Cologne, he healed twelve lame and caused three dumb persons to speak. When he himself was sick, St. Lawrence appeared to him and cured him by touching the hand to the affected part. St. Cecilia cured a leper that was shunned by all men, by embracing him. During the Middle Ages, the Church was

forced to divide the so-called miraculous gifts to heal with the various monarchs. The kings of England and France cured diseases of the throat by touching the affected part. The Prince of Hasburgh is said to have cured stammering by a kiss! The more advanced thinkers of the time began to investigate the methods employed by these workers of miracles and found that they likewise had the power to produce them, thus divesting them of their miraculous origin. In the 16th century, Paracelsus, a thinker much in advance of his time, taught and demonstrated that man possessed the potentialities within himself to cure disease. As the human mind ever seeks to explain that which it cannot understand by the theory that appeals most rationally to the investigator, so each experimenter unfolded his own peculiar hypothesis of the nature of that attribute of mind that could be utilized in the cure of disease.

Not wishing to burden the reader with a detailed account of the theories advanced by the various schools and sects of mental healers, we will briefly consider the six most prominent methods now in vogue.

(1) *Prayer and Religious Faith*, as exemplified in modern times by the cures effected at Lourdes and other shrines. To this class belong what are known in this country as the Faith Cure and the Prayer Cure.

(2) *The Mind Cure*.—A method that assumes that all diseases of the body are due to abnormal conditions of the mind; therefore, that all bodily infirmities may be cured by the direct action of the patient's mind directed toward the establishment of health; or, by the mind of a healer who by verbal or telepathic suggestion has the power to dispel disease.

(3) *Christian Science*.—This method of cure declares the unreality of matter—that our bodies are unreal, consisting of what they call “mortal mind,” likewise devoid of matter. They teach that disease has no existence; yet, notwithstanding this assumption, they pretend, and in many cases really do, cure that which they admit cannot exist. This, without doubt, is the most irrational and absurd of all methods of mental healing; yet its converts are numerous, representing many of the more cultured and refined members of society. As Paracelsus said: “Whether the object of your faith be true or false, you will nevertheless obtain the same effects.”

(4) *Spiritism*.—This is a system of healing based upon the

assumption that the spirits of the dead operating either directly or indirectly through a medium, have the power to communicate such suggestions and remedial measures as may cure disease.

(5) *Mesmerism*.—This includes all of the various systems that are founded upon the belief that there exists in man and pervading all space, a fluid that may be projected, by the will of an operator, with the effect of curing disease by the specific virtues of the all-prevailing fluid.

(6) *Suggestive Hypnotism*.—This method of healing rests upon the law that persons in the hypnotic condition are constantly controllable by the power of suggestion; that by this means pain is suppressed, function modified, fever calmed, secretion and excretion encouraged, and Nature, the true healer, is permitted to do the work of restoration. (Hudson.)

These are the main divisions of the various systems of psychic therapy recognized at the present time. Each of these systems is divided into various sects differing but slightly from the several principal divisions.

From an examination of the above methods, it will be made apparent that each of these six systems pretends to and really do cure disease by purely psychic means, yet each system is diametrically opposed, both in theory and principle, to the others. It must, therefore, become evident that underlying these various mental methods of healing there must exist a living principle or law of universal application.

Recognizing the fact that we are surrounded by and almost daily encountering strange and unaccountable phenomenon inexplicable by our modern methods of investigations, there was organized in England in the year 1883, the Society of Psychical Research, a body of the most learned and scientific men of our age, whose object it was to investigate in a most critical and impartial manner the phenomenon of spiritism, mind healing, hypnotism, thought transference, and such other subjects as seemed to pass beyond the borderland of the known. During the past twenty years this society has constantly labored with the result that many hidden psychological labyrinths of the human mind have been explored. That there still remain many mysterious phenomena unexplained, is very true, but let us be thankful that the work done by these self-sacrificing men has helped us to grasp the two strands of the tangled knot of

consciousness, that we may know something of the attributes of our objective and subjective minds.

The investigations of Myers and Hudson have established the fact by experiments upon hypnotized subjects, that man possesses two planes of consciousness. Therefore, to facilitate the study of mental healing, we will divide the mind into two distinct entities. The one, our active waking consciousness, we will designate as our *objective mind*, while the other, that sleeping consciousness that seldom passes beyond the threshold of our waking existence, except at rare intervals, we will call our *subjective mind*. The objective or waking mind possesses the faculty to reason from cause to effect, thereby deducing logical conclusions. It is susceptible to education and culture and is the seat of that attribute of mentality known as *will*. It may, therefore, be classified as our guiding or directing consciousness. The subjective mind is that plane of consciousness that presides over the mysterious processes of life. It is that subtle energy that holds each organ, structure cell, molecule, and atom of our body in that perfect physiological balance which we call health. Unlike our objective mind, it has not the power to reason and deduce logical conclusions, but on the contrary, accepts whatsoever suggestion it may receive. This has many times been proved by hypnotic experiments. Hypnotism is a state in which the objective mind is held in abeyance, thereby permitting the subjective mind to receive and accept the suggestions of the hypnotizer. By this means, it is possible to make a hypnotized subject believe the most absurd and irrational ideas and perform grotesque actions as the will of the operator may direct. If, for example, John Smith is told during hypnosis that he is a dog, he immediately accepts the belief that he is a member of the Canine family. He walks upon his hands and feet, barks and really feels for the time that he is a dog. But the subjective mind not only accepts suggestions of states of being, but also directs such bodily states and activities as it is suggested to perform. As proof of the power of the subjective mind under the influence of suggestion to direct the functions and activities of the body, we will cite the following experiments. Dr. Bernheim, of Nancy, hypnotized a subject, after which he placed a postage stamp upon one arm and a fly blister upon the other. He then suggested that at the end of twelve hours, when the two were to be removed,

the skin beneath the blister should remain perfectly normal while beneath the postage stamp there should form, in the meantime, a blister filled with serum. At the end of the appointed time, the two were removed, demonstrating the fact that the suggestion had been fulfilled, as beneath the stamp was found a well-filled blister.

MM. Bourru and Burot of Rochfort, hypnotized a young man after which he was given the following suggestion. By Dr. Bourru: "At four o'clock this afternoon you will come to my office, sit down in the armchair, cross your arms upon your breast, after which your nose will bleed." At the appointed time, the subject came, sat in the chair as was suggested, crossed his arms, when blood was seen to be dripping from the nose.

Dr. Forel rubbed the arm of a nurse whom he hypnotized, with a blunt instrument. He suggested that at the end of several hours, blood should issue from the part thus stroked. At the appointed hour, blood did issue from minute points along that part of the arm acted upon.

It will thus be seen that the subjective mind has more or less complete control over bodily functions. It is not alone during hypnosis that this plane of consciousness controls the life processes taking place within our bodies, but it operates at all times. It is our ever vigilant guardian that directs the mysterious enigma of life.

Neither is it necessary that the hypnotic state should be induced that we may study its manifold manifestations. During our waking existence, the subjective mind is forced by the more dominant objective state, behind the portals of consciousness; it is ever operative, and man after all, is but the creature of suggestion. Herein lies the key that unlocks the mystery of mental healing and makes man a slave to disease. There is no person living that is not in some degree susceptible to suggestion. Somewhere in his mental armor there exists a cleavage through which this subtle power may find entrance, thereby changing many times the whole fabric of his mental, yea, and even his physical being. In ordinary life we call this *persuasion*. How often are we persuaded, even against our better judgment, to do that which we may know entails danger to ourselves. A. is persuaded by B., who is skilled in the art of suggestion, to invest his money in a hazardous speculation. His good common

sense tells him that it is unwise to do so. Yet B. finds his mental foible, which he uses to skillfully apply the suggestion that finally leads A. to not only invest his money, but really to believe in the undertaking. This not only applies to the affairs of ordinary life, but to disease as well. We are, to a great extent, protected from adverse suggestion by means of our objective mind as it in a great measure guards the portals of our subjective consciousness. But when that state of perfect physiological balance which we designate as health becomes in any way disturbed, our objective mind participates in and is in like proportion disabled, thereby opening avenues of communication to all manner of suggestion to the subjective mind. What untold harm is often caused by these untoward suggestions! How often have I seen a poor sufferer stricken with disease, weakened in both body and mind, tortured by this power of adverse suggestion! One friend comes to see him and says: "You are not looking as well to-day; you seem weaker. I fear that you are not doing as well as you should." This suggestion falls like an avalanche upon this poor patient. His subjective mind accepts it in like proportion to the extent that the enfeebled objective mind can combat it, and the poor sufferer is bound to be made worse. Another friend comes in. She says: "You are certainly not improving. If I were you I should try Dr. Cureall. He cured Mr. Tryall, who was much worse than you are." The patient before had faith in his physician; now he begins to doubt and wonder if it would not be best after all to try Dr. Cureall. Thus friend after friend comes, each giving the patient an adverse suggestion. The patient is not only made to believe that he is worse, but his condition is actually aggravated and many times he passes beyond the control of the more skillful physician as the result of these adverse suggestions. Contrast this picture with that of a Christian Scientist. Although the philosophy of this sect is the most illogical and irrational mass of nonsense that was ever imposed upon the credulity of man, yet those who practice it have unconsciously hit upon the marvelous power of suggestion as a factor in the cure of disease. They have learned the potent power of cheerfulness upon the sick. They confidently assert that there is no disease; that what we think is disease, is but a mental illusion; that we have but to have faith in the teachings of the founder of this sect to be made well.

Hopeful and cheerful suggestions are directed to the subjective mind of the patient. In the silent treatment that follows, the mind, cheered by hopefulness, is lulled into that borderland state of semi-consciousness—a condition of partial hypnosis, in which the subjective state accepts the suggestion of health and well-being, and, after a time, also—the absurd doctrines of this system of healing.

The principle underlying all systems of mental therapy is the same. Two elements are essential to the fulfillment of a cure by psychic means, viz., *faith* and the *skillful application* of suggestion. To this we should also add a third. A *passive* and *receptive* condition of the patient whereby the subjective mind is allowed to receive and accept the suggestion.

Why faith is an important element in mental healing, we do not know, and perhaps never shall. But throughout all the ages, all systems of psychic therapy have insisted upon it. Even Christ, the greatest of all healers, declared it as absolutely essential and continually upbraided his disciples for their lack of this important element. It is the essential element of all systems of healing, and happy, indeed, should be he who has the faith in his physician's ability to cure his ills and the faith in himself to resist them.

The subjective mind not only receives and accepts suggestions from others, but its greatest and most marvelous gift is its power to accept and carry out the dictates of the objective mind of the individual. This is called auto-suggestion, and what a vast amount of misery and suffering might be obviated were man to understand and develop this great power and privilege? We have shown that the subjective mind governs and directs the bodily functions. We have likewise shown that it is itself governed and directed largely by the objective mind. Therefore, each thought and logical conclusion of the objective consciousness becomes imbedded and accepted by these lower strata of consciousness, thereby influencing our lives and actions. As the sculptor gradually unfolds the lineaments of his model upon the inert mass of clay before him, so our thoughts, which are the suggestions that we give to our subjective mind, slowly engrave upon our features the landmarks of our individuality. We are that which our thoughts make us, and have the power by the law of auto-suggestion, to completely change and remodel our bodily tenement. We are bound to

become that of which we think. He who thinks of money at the expense of all else, becomes a miser whose whole personality becomes permeated by the greed for gold. All else becomes subservient to this passion. The conscience becomes seared, the higher sensibilities paralyzed, and the body diseased by this continual auto-suggestion of wealth. There are thousands of invalids to-day demonstrating the power of auto-suggestion. In health, our organs functionate so perfectly that their sensations are never brought to the surface of our objectivity. But should there be from any cause a disturbance of this physiological equilibrium, we suffer pain or discomfort and become conscious of the organ or part affected. The normally healthy individual soon reacts from these slight disturbances of function. But with those born of lessened powers of resistance as the result of vicious heredity, it is very different. Abnormal bodily conditions do not tend to regain their wonted equilibrium. Pain and discomfort persist and the consciousness of the sufferer becomes more and more centered upon the affected part. The objective mind becomes imbued with the idea of pain and bodily discomfort and likewise continually suggests the same to the subjective mind, which in turn not only accepts the suggestion, but continues to direct the bodily functions over which it has control, in an abnormal manner. Thus a vicious circle becomes established. The adverse auto-suggestion produces disease, and disease produces sensations that call forth auto-suggestion. The invalid goes on from bad to worse until at last the whole consciousness becomes centered upon abnormal bodily sensations and the patient drifts into a state of chronic invalidism in which he thinks, talks, and even dreams of naught except his bodily infirmities. Were such unfortunate people to know of and develop the power of auto-suggestion, how much suffering would thus be prevented? Were such patients to concentrate their consciousness upon health rather than disease; were they to think of the misery of others rather than their own; were they to develop their will power to healthfully direct life's forces, there would be by far less disease and suffering and a much happier state of existence. We would then possess the potentialities by which many ills could be prevented and cured and mankind would also be protected from that vast army of charlatans who pretend to heal disease by means of mental power the fundamental principles of which they understand no more than they comprehend the elements of anatomy, physiology, pathology, and the natural history and diagnosis of disease, all of which must certainly appear as necessary to those who would intelligently hope to cure it.

Editorial.

THE RECOGNITION OF STASIS IN THE TREATMENT OF CHRONIC DISEASES.

THE class of diseases which generally resist medicinal treatment are those characterized by the presence of a slow inflammatory process, which may result primarily from some slight traumatic injury or diseased condition for the repair of which natural provisions have failed. In these cases, *stasis* once established has been the obstruction to complete recovery, and the surrounding regions have participated in the inflammatory process resulting in chronic infiltration or hyperplasia. While this state of affairs has often been recognized, means of overcoming it have usually been of a character which has failed to meet the conditions. The use of such drugs as iodide of potash has not been successful. Mechanical measures, when properly applied to regions where stasis is present will relieve the local conditions. Static electricity will meet and overcome local stasis in a most thorough and scientific manner, both in the superficial and deep affections. What is required in the early stages of a localized congestion to relieve the engorged condition is also indicated in the later stages when the active hyperæmia has subsided, and passive congestion and infiltration persist. Pain and tenderness will be present in regions where chronic stasis is found, making an abnormal condition which, without active treatment, may persist indefinitely.

Sciatica occurring under these conditions passes first through the acute stage of congestion, accompanied by severe suffering which may last for long periods, and finally merge into a chronic condition associated with pain. The chronic stage will be present in varying degrees, and the limb may become atrophied and the case terminate in a condition of delayed regeneration. At no time in the history of a case of sciatica can

it be considered an incurable affection, and the earlier the region of local stasis and the associated infiltration are relieved, the shorter time will be required to effect a cure. It is useless for anyone to-day to oppose the statement that neuritis is promptly curable in every uncomplicated case, by any measure which will effectually overcome the local stasis, and restore normal circulatory conditions in the part. Though authorities may controvert the statement, it has been demonstrated that by skillful static treatment the inflammatory area may be easily disengorged and normal conditions restored. The earlier in the history of the case proper treatment is instituted the shorter will be the time required to effect a satisfactory result. In the stage of the first acute inflammation, the application of the wave-current from the static machine and sparks to the region will cure the condition in a few days if judiciously applied. So in all inflammatory conditions not associated with a specific process or the presence of a foreign body may local stasis be overcome, and the patient cured of conditions which defy the methods too commonly in use at this time.

Rheumatoid arthritis, the effects of acute articular rheumatism, prostatitis, seminal vesiculitis, tonsilitis, congestions of the abdominal and pelvic viscera, as well as all traumatic injuries, can be most effectually relieved of *local stasis*, which so generally obstructs a prompt recovery. Failure to recognize the fact, that the condition is the cause of continued inflammatory processes, and the adoption of means which, acting as a *vis a tergo*, will restore the normal activities in the parts, is a most unfortunate shortcoming with some members of the profession to-day.

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ANNOUNCEMENT.

IN another part of the Journal will be found the announcement of the programme for the next meeting of the American Electro-Therapeutic Association, to be held at Atlantic City, N. J., September 22, 23, and 24, 1903.

The price of the round trip from New York to Atlantic City will be \$4.75 for the members and their friends.

Progress in Physical Therapeutics.

GYNECOLOGY AND APPLIED METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D., PHILADELPHIA, PA.

The Treatment of Uterine Fibromyomata.

F. W. Haultain, M. D., F. R. C. P. Ed., Lecturer on Midwifery and Diseases of Women, Edinburgh School of Medicine, contributed a most interesting paper* to the Edinburgh Medical Journal for March, 1903. The views enunciated are particularly valuable as coming from a surgeon who is also skilled in the expert use of electricity in this affection. The paper is so readable to those interested in this subject that it is reproduced *in extenso*, with the exception of the portion in which the various radical operations are technically described.

There is no subject in clinical gynecology which, at the present time, lends itself more to discussion than the treatment of uterine fibroids. On the one extreme these growths are looked upon as being so trivial that they call for no treatment unless symptoms are very urgent, then palliative measures may be employed to tide the patient over the menopause, when the growth will cease from troubling. On the other, their presence is considered at all times to be a menace to life, and when recognized, nothing short of their removal, and, if need be, of the uterus as well, is to be recommended. With such extreme opinions as these, held by eminent gynecologists, the sufferer frequently is thrown on the horns of a dilemma, should she unfortunately have had sufficient interest in her condition to have acquired dual advice. From personal experience in the course of gynecological practice, there is no condition upon which I am asked to give independent advice more frequently than this; and, further, there is certainly none upon which my opinion is more questioned and sought to be corroborated or otherwise.

That such divergence of views should exist, is to be expected, I believe, from two aspects—first, the extreme variability of the clinical course of these tumors; and, second, the rapid recent advances in gynecological surgery.

As is well known, the clinical features of fibro-myomata vary almost entirely with the original site and mode of growth in the uterine wall. The more they tend to grow towards the uterine cavity, the more evident and severe the symptoms become; thus

* Read before the Edinburgh Obstetrical Society.

a submucous nodule the size of a walnut may imperil the life of a patient, or at least reduce her to a state of absolute invalidism, infinitely more than a subserous tumor the size of a football. Further, from alterations in their capsule, some tumors in any situation may at times cease to grow and become spontaneously inactive, while after the menopause the majority atrophy or become inert, although a small percentage take on increased activity of growth and malignant change.

With these differences in their clinical course, it is evident much latitude is given for the conservative physician to support his principles of hope, trust, and patience; while at the same time the more radical surgeon has a solid foundation for his policy of action.

What has led, however, to this great diversity of opinion more than anything else, has been the enormous advance in surgical methods and technique, which has robbed the radical treatment of these uterine growths of its terrors, and rendered possible, with ease and safety, what twenty years ago was considered, if successfully performed, an operation of almost miraculous character.

It would appear as if at present we were in the transition stage, where the older gynecological physician has not advanced with the studies of gynecological surgery, and views the treatment from the standpoint of his early practice and teaching; while on the other, as in all great advances, we have the opposite extreme of excessive zeal begotten of novelty. I have ventured, therefore, to bring this important subject before the Society in the humble form of my own experience, with the hope that a valuable expression of opinion may be given from among its members, so that some definite lines of guidance may be laid down which may be of benefit not only to ourselves, but which may help to remove that variance of opinion which must breed in our patients discomfort, from want of confidence.

The treatment of uterine fibromyomata may be divided into symptomatic and radical.

The former embraces the exhibition of drugs, the employment of electricity, and the removal of the uterine appendages, and the latter the operations of myomectomy and hysterectomy.

SYMPTOMATIC TREATMENT: Medicinal.—This practically resolves itself into the exhibition of ergot, which, from its action in stimulating the contraction of unstriated muscle, is of special value in bleeding from the uterus, as it not only causes contraction of the vessels, but also of the uterus itself. By this means growths in its walls are firmly compressed and their nutrition impeded; while at the same time they are frequently extruded towards the uterine cavity, and expelled, or outwards beneath the peritoneum, when the symptoms of hemorrhage are not so urgently manifest. Until comparatively recently, the treatment of uterine fibromyomata was almost entirely con-

finied to the use of this drug. Now, however, this method has been almost entirely superseded by more efficient means, and should only be exercised where symptoms are of a trivial nature, as the prospects of cure are distinctly remote, and even then after a very prolonged period of irksome treatment. As I have already said, I intend mainly in this communication to give a résumé of personal experience. This, so far as ergot is concerned, is practically nil; thus I am incompetent to give an opinion of any weight, and shall pass to the next method, namely *electricity*. I may say, however, I have met with many cases where a prolonged course of treatment by ergot had been tried before I saw the patient.

ELECTRICAL TREATMENT.—In a paper I read before this Society nine years ago, I gave an account of twenty-two cases treated by this method, and in a subsequent communication, in 1896, an account of three cases treated by electric-negative puncture. Since that time I have treated a large number on similar lines with very similar results. I have considered it, however, better to confine myself to the record of the early cases described, as sufficient time has elapsed to form an opinion of value of the ultimate benefits derived from this form of treatment.

Of the twenty cases which I at that time stated to have had their morbid symptoms cured, I have been able to trace fifteen; nine have remained cured, and five of these have reached the climacteric; of the other six, two had return of bleeding, one of these expelled a large polypus, and has remained well since; in the other I performed oöphorectomy a year ago, having previously removed three years before three small polypi which temporarily stopped the hemorrhage. In two the tumor continued to grow to such a size that only hysterectomy could be recommended; in one this was acquiesced in and successfully performed; the other still refuses operative treatment. The remaining two cases showed evidence of active change in the growth. In one of these I removed the uterus by supravaginal hysterectomy five years ago, and she is now in absolute health, though the microscopic appearances of the tumor were undoubtedly myxosarcomatous, as I showed to the Society at the time. The other I saw for the first time again a few weeks ago, when she told me she had been absolutely well since the electricity was discontinued, until some months previous to her visit to me, when pressure symptoms had manifested themselves. On examination, I found the pelvis blocked by a large soft tumor, which I had little doubt was due to some malignant degenerative change in the pre-existing tumor. I offered to attempt its removal, but so far have been unable to prevail upon her to allow me to do so.

Shortly, then, the result of the electrical treatment on these fifteen cases may be summed up as follows:—Nine cured, two

hemorrhage recurred; two continued to grow; two underwent active degenerative change.

A result such as this must, I think, be considered most satisfactory, and fully corroborates what I at that time said of the great value of this form of treatment.

Removal of the appendages, as recommended by the late Lawson Tait, is undoubtedly of great service in the treatment of uterine hemorrhage, by inducing a premature menopause; and in the treatment of fibromyomata it is of special value through this means, by promoting the atrophy of their growths which usually occurs after the climacteric.

It is limited, however, in its application by its impracticability in many instances, and also by the fact that in a percentage of cases it fails to produce the benefit desired. Failure to arrest bleeding has been stated by some operators of large experience to be met with in as large a proportion as 15 per cent. of cases. My personal experience in this operation is represented by nine cases; seven of these have been entirely satisfactory; in one the bleeding was stopped but the tumor continued to grow; while in another no benefit whatever occurred from the operation, either as regards hemorrhage or growth, and hysterectomy had subsequently to be had recourse to.

In the soft œdematous type of fibroid, removal of the appendages seems to be absolutely valueless, and should never be attempted. Before myomectomy and hysterectomy were performed with such safety as they now are, this operation was frequently performed, and justifiably so; but the excellent results now obtained by the more radical operations have restricted its sphere of application, as the uncertainty of its beneficial effects in so large a proportion of cases hardly warrants one in exposing the patient to the risk of opening the abdomen, with only the probability of a cure and a 15 per cent. chance of failure.

RADICAL TREATMENT.—This is represented by the operations of myomectomy and hysterectomy, either of which may be undertaken by the vaginal or abdominal route. . . .

My own experience in hysterectomy for fibromyomata only amounts to thirty-two cases, twenty-eight of which I have performed by the supravaginal and four by the total extirpation method. Two of the latter I did by selection, to gain an experience of the method; in the remaining two, I had to adopt the procedure, as the cervix was involved in the growth, which in one case was undergoing sarcomatous degeneration.

The operation was undertaken in the thirty-two cases mentioned:

For hemorrhage, 20; pressure, 7; abdominal prominence, 3; pregnancy, 1; malignancy, 1.

Pathologically, they might be tabulated—

Multinodular, 20; calcareous, 1; œdematous, 7; cystic, 1; with carcinoma, 1; sarcomatous, 2.

The seven œdematous growths were in each case single and interstitial, and though enlarging the uterine cavity greatly in every instance, were only accompanied by hemorrhage thrice. Hemorrhage was the prominent symptom in the multinodular variety. Pressure symptoms were either due to the large size of the tumor or its impaction or growth in the true pelvis.

The results of the thirty-two cases I have thus treated have, with one exception, been absolutely satisfactory. In this instance, I performed the pan operation for a very large sloughing tumor, which was projecting through the widely dilated cervix. The patient died on the third day from septic poisoning, having probably been infected from the gangrenous fibroid. This is the only fatal result I have had in the operative treatment of fibroids by any method.

The remaining thirty-one cases of hysterectomy all recovered without an untoward symptom. Indeed, it is to me a most surprising and at the same time gratifying coincidence,—the singular absence of shock or even discomfort after these operations, even in patients reduced to the extremes of bloodlessness. Their convalescence is much more rapid than even after a simple ovariectomy, the only discomfort complained of being that which is necessarily connected with the abdominal incision. In extremely anæmic cases, I have, almost without exception, noted a swinging temperature, rising as high frequently as 102° F., unaccompanied, however, with any corresponding rise in the pulse rate. Should the ovaries appear healthy, I do not remove them, as by this means the harassing symptoms of an artificially induced menopause are avoided.

From what has been stated in the foregoing pages, it will be evident that the treatment of uterine fibroids offers considerable latitude for diverse opinions, but no support can be given to either of the extreme views held, as mentioned in the beginning of this article.

The presence of a fibroid of the uterus, even if it be of considerable size, should it give rise to no symptoms, is no indication for treatment of any kind being adopted. The possible chance of its becoming malignant is so remote, that its removal from that aspect is totally unworthy of the slightest consideration, and should it commence at any time to give rise to symptoms, treatment then can be adopted as required.

It may thus be broadly said that uterine fibro-myomata which give rise to no symptoms or discomfort should be left alone, at least so far as surgical interference is concerned.

On the other hand, whenever marked symptoms appear, treatment is urgently demanded, as the general tendency is for these to continue and become aggravated unless the climacteric intervenes.

If treatment be thus necessary, one must naturally decide in what manner it is to be undertaken; and, from what has previously been stated, the selection of the most suitable and efficient method is by no means a sinecure, depending as it does on so many different conditions.

Thus in the typical case of a patient *æt.* 35, who is more or less invalided from menorrhagia, the result of an interstitial fibroid the size of an orange, it is extremely difficult to decide on the proper course to pursue. Being a free country, the patient herself may desire to continue in her crippled condition, as one must admit to her that the chances are distinctly against her bleeding to death. At the same time, tinkering treatment such as ergot, resting at the periods, hot douching, and even curetting, may be desired, by which means she manages to pass through years of an existence of semi-invalidism and comparative uselessness, till eventually either the delayed menopause may terminate her suffering after the best years of her life are past, or symptoms may become so urgent that more radical methods of treatment are demanded and undertaken in her weakened state. To sanction and aid such a career is, I consider, quite unworthy of our profession, and curative methods ought in all such cases to be recommended; and it is now that the main difficulty arises, in proposing the most desirable means.

This practically resolves itself into either electrical treatment or abdominal section.

The former, I know, is almost universally scorned, but I very much question if legitimately so. From experience, as I have shown, it certainly deserves much greater deference than it has been shown, and is certainly more worth trying than the "tinkering" methods so frequently adopted. Resulting, as it does, in a fair proportion of complete cures, it ought certainly to be advanced as an alternative to the more severe operative methods of treatment, in cases suitable for its adoption, and also where operation is absolutely repudiated by the patient. It seems to me that the main reason for its being almost generally decried is because of failures the result of its adoption in unsuitable cases, such as submucous tumors. Here it tends to aggravate hemorrhage by stimulating uterine contractions, which thus drive the growth more into the uterine cavity in their attempt to expel it. When used for interstitial tumors of medium size, it seldom fails to prove beneficial, and for these its use should be mainly adopted. Further, should it fail in its action, no harm is done (as is so often stated), and subsequent operation is not in any way complicated, as I have proved from experience. I should like here to express the great importance of making an absolute diagnosis of the variety of tumor we have to treat in uterine hemorrhage. This, in many cases, can only be acquired by thorough dilation of the cervix and digital examination of the uterine cavity. By this means many a

uterus may be saved by the recognition of a stalked growth which can easily be removed, and the patient saved from undergoing a more dangerous operation.

Should operative measures, however, be consented to, the alternative procedure of removal of the appendages or of the tumor by myomectomy or hysterectomy, has now to be discussed, the former with a possibility of a 15-per-cent. failure and a minimum of risk, or the latter an absolute cure with a questionable 6-per-cent. mortality. The decision must eventually rest with the patient; but personally I have no hesitation in advising the more radical method. In all cases the consent of the patient should be got to perform the major operation should the minor be attempted and found impracticable. There is, so far as I know, nothing in gynecology to equal the satisfactory results obtained after the removal of fibromyomata. The patient is restored to absolute health after, in most cases, many years of inactivity and invalidism. In whatsoever manner it is done by competent hands, the risk is now so comparatively small that it seems well worth risking, as an absolute cure can be guaranteed in almost every instance.

[It seems scarcely proper to attempt to add further to Dr. Haultain's very judicial summing up of the relative value of electricity and the knife in the treatment of fibroids, particularly when Dr. Haultain so ably champions the electrical treatment in proper cases in spite of his excellent results with operative methods. The writer must say, however, that we need some re-study of the successful cases of removal at such periods as has been reported after electric treatment. Let us have a report of the condition of these patients, also, nine years after the operation. Judging from the editor's observation a considerable proportion will be found suffering from hernia (about as bad, even worse, a tumor than the original one), chronic constipation, or neurasthenia, to say nothing of abolished sexual functions, directly traceable to the operation. These remarks amount to nothing, of course, if the removal of the tumor was actually demanded by the clinical condition, but they are important if the case belonged to the class that is amenable to electric treatment.—G. B. M.]

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

Triteresol in Para-Urethral Abscess. By M. L. Heidingsfeld, M. D., Boston Medical and Surgical Journal, April 16.

This is a report of four cases, in which the para-urethral abscess was injected hypodermically with triteresol. This injection was made into the center of the abscess, the dose varying according to the size of the abscess, but only a few minims were used, even in large abscesses. In all of the cases the result was surprisingly successful. The cure was perfected in from seven to fourteen days, and in three cases a urethritis was cured, which was of a gonorrheal origin, and showed aggravated symptoms. This treatment is entirely new, and we may expect more reports of cases in order to establish this remedy as a certain cure in para-urethral abscesses, and analogous cases.

The Diagnosis of Gonorrheal Urethritis. Alfred H. Gould, M. D., Boston Medical and Surgical Journal, April 16.

This article recommends as a necessity, that each case should be examined thoroughly microscopically, and to make culture tests, in order to make the differential diagnosis of a simple urethritis or of a real gonorrhea. The author cleanses the meatus. He only uses sterilized vessels, and has the urine passed in two glasses or test tubes. The sediments are used for culture.

The advice is very good, but many doctors have no time to do laboratory work, and are not remunerated for the test by poor patients.

Paroxysmal Hematuria. Wm. Gilman Thompson, M. D., Association of American Physicians, May 14.

Report of two cases, one case of sixteen years', the other of fourteen years' duration. The attacks were brought on in both cases by slight exposure to cold and fatigue. In neither case was there jaundice. In the literature two hundred and six cases are enumerated. It seems that the disease can be traced to heredity, syphilis, urticaria, etc. It was a disease of the nervous system. In closing, the author defined this disease as a vasomotor neurosis.

Results of Decapsulation of the Kidney. By Harold A. Johnson, M. D., Annals of Surgery, Philadelphia, April.

This is a report of vivisection on fifteen dogs. Five of them died. The claims of Edebohl are not proven by these experiments, that the benefits sometimes derived from this operation

are due to the establishment of a collateral circulation, but rather that they are due to relief of tension from splitting the capsule of the kidney.

The Uses and Abuses of the Urethral Sound. By J. Henry Dowd, M. D., American Medicine, Philadelphia, May 16.

The author is known as a good surgeon, but the conclusions in this paper are so different from the reporter's experience and writings that it is useless to discuss the paper. Many surgeons will agree with the paper and cut strictures, while the reporter succeeds in every case with electrolysis, and has reported cases by the thousands, and never uses at a séance more than one instrument.

Practical Experiments of Electrolysis, and its Treatment of Urethral Stricture. By Robert Newman, M. D., Medical Bulletin, Philadelphia, May.

The experiments consisted in showing before the Medical Society of the Bronx that electrolysis is a fact, and the appearance on meat, eggs, and the action of the poles in decomposing a salt. Then the technique was explained for electrolysis of urethral strictures, and the different sets of electrodes exhibited.

The Significance of Albumen and Casts in Surgical Patients. By John C. Munroe, M. D., Boston American Surgical Association.

This paper gives a personal observation and conclusion from the study of 500 cases, in which the house-surgeon of the Boston City Hospital found albumen and casts after careful examination; but other points in the history of these cases did not show any serious disease of the kidney. Therefore he used in his operations ether, without experiencing any bad consequence. A more important point for the prognosis he considers a high specific gravity, which indicates the excretion of the total solids. Most of these patients were young, and came from poor families, who were not well fed. In most cases the albumen disappeared from ten days to two weeks after rest in bed, and a better nourishment. In all 500 cases no bad effect was observed from the use of ether. The paper was ably discussed.

The Local Treatment of Acute and Chronic Gonorrhea. By R. O. Kevin, M. D., Medical Record, June 6.

In this article urethral injections are recommended, which are indicated for the case, according to the pathological conditions, which have no irritating character, and will destroy the gonococci in all layers of the urethral canal. After the trial of many drugs, a new preparation of silver, the argyrol, has been ob-

served in 2500 cases. In acute cases the urethra is cleansed, and then an injection given of a twenty-per-cent. solution of argyrol, which is retained for ten minutes. These injections are repeated every three hours, night and day. The treatment is troublesome, sometimes patients will not execute the order, but it is very effective. The disease is cured in a short time. If the case, however, is already in progress for several days, injections of a five-per-cent. solution are used, and retained five to ten minutes.

Complete cures have been effected in three to six weeks in eighty-five per cent, of private patients. In chronic posterior urethritis the argyrol is used as an ointment with lanolin in five to twenty per cent. Belfield, of Chicago, has used this remedy in infection of the prostate follicles. This article is an honest report of observation in a large number of cases.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Pathology and Diagnosis of Otitis Media Insidiosa.

Sclerosis is fundamentally a hyperplasia of the bony capsule of the labyrinth; the hyperplasia is a transformation of cartilage into bone (metaplasia), accompanied by formation of outgrowth of bone (hyperostosis). (Henry J. Hartz, *Annals of Otolaryngology, Rhinology, and Laryngology*, November, 1902.) It is initiated by constitutional diathesis, such as inflammatory rheumatism, gout, syphilis, and scrofula, by diseased tonsils in the pharynx and vault, suppurations with calcareous deposits in the tympanic cavity, exposure to cold and wet, and injury. Its localization is usually in the labyrinth capsule, near the stapes articulation with the oval window, inducing fixation of the ossicles. It may involve also the semicircular canals and cochlea, to produce symptoms of nervous deafness. It may effect simultaneously the sound conduction, and the sound perception apparatus. The functional test, the subjective symptoms, and family history permit an early diagnosis of this disease. These are:

1. Hyperæmia of promontory.
2. Heredity.
3. Schwabach's test reveals prolonged bone conduction.
4. Rinne's test is negative in varying degree.
5. Defective perception of one-half to one and one-half octaves of the low tones.

Probably ten per cent. of the middle ear diseases are true scleroses, and are designed synonymously capsulitis labyrinthi, otosclerosis, spongification, dry middle ear catarrh, and

otitis insidiosa. The therapy is effective in early stages of the disease by hygienic and medicinal treatment. The more advanced cases may be improved by judicious treatment, with amelioration of tinnitus.

A New Method of Treating Ozena by Means of Luminous Rays.

At the last meeting of the Congress of the Italian Society of Laryngology, Otology, and Rhinology, Dr. I. Doinisio, of Turin (Laryngoscope, April 1903), presented a preliminary communication based on the claims presented January 21, 1903, to the Royal Academy of Medicine of Turin. This treatment was applied to fourteen patients with ozena by means of different sorts of light (solar light, electric arc light, incandescent electric light, acetylene, Auer's gas). The light was projected through the dilated nares by means of lenses, and of reflectors or the introduction of incandescent lamps or glass cylinders, strongly illuminated from without, into the nasal cavity. During a very long treatment (lasting two or three months; two daily sittings of about two hours each), the patients were free of crusts and of fetor, without having had recourse to douches; in such a case the cure lasted six months. At present the author is trying the action of monochromatic light (violet), which he obtains by means of an electric current of high tension. He cannot yet state whether the results obtained are due to a bactericidal action of the light, or to an action stimulating the nutrition of the tissues. In conclusion, Dionisio stated that he had used light treatment in five cases of chronic purulent otitis media, with results not afforded by other methods; in three cases he obtained a complete cure after two months.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

Influenza in Children. By Dr. Carver Williams of Chicago.

Dr. Williams, in an article read before the Fifty-fourth annual Session of the American Medical Association, and published in the Journal of the Association on July 4, brings out many points of interest well worth considering. He says that *influenza vera* in children differs from the disease in the adult, in proportion to the difference in constitution, vital resistance, and recuperative power, and that the disease is of a remarkably toxic nature. He quotes authorities to fortify his own experience to show that in children the common symptoms, such as backache, rigors, and pain in the limbs, are often absent, while earaches, glandular swelling, and cough resembling whooping

cough are often present, and that the invasion in children is more often insidious and slower than in adults.

Quoting from a personal interview with Dr. Wynekoop, of the Chicago Department of Health, that gentleman stated that of 2,460 examinations made of culture from throats in cases of suspected diphtheria, 677 showed Canon-Pfeiffer bacillus as the only pathogenic organism, while of these 677 cases, in 173 the diagnosis of diphtheria was definitely made from clinical findings, yet the Klebs-Löffler bacillus was not present. From Washburne and Ayres he reports twelve cases of death from pneumonia in children, of which the autopsies showed the Canon-Pfeiffer bacillus present as the main factor in the disease in eight of them, though previously unrecognized.

In a series of fifty cases, showing some of the more serious manifestations, he has rarely failed to obtain a definite history of indigestion, constipation, a common cold, or some other previous disturbance of the mucous membrane. All sources of infection should be carefully guarded, and the bowels kept regular. The catarrhal manifestations he regards as due mainly to the micro-organisms, while the nervous and circulatory and febrile types are attributed to toxic origins. The Canon-Pfeiffer bacillus, as is the case of the Klebs-Loeffler, produces an exceptionally active and deadly toxin capable of not only over-powering the vital organs, but of actually destroying their structures to some extent, through degeneration. This being so, one can see how multiform in appearance and how serious in extent may be the history of such cases. Cases are reported by careful observers of meningitis, multiple neuritis, hemiplegia, neurasthenia, and various mental disturbances of endocarditis, arthritis, and various other nomalies of circulation, with their consequences.

This remarkably practical paper is well worth reading, and emphasizes that where the diagnoses in many cases are in doubt the microscope will often remove it, and make the disease under consideration clear. Furthermore, it emphasizes the fact that when the acute disease is apparently cured, grave sequelæ, which may follow in one form or another, are to be apprehended, and if not promptly met and carefully treated, death, madness, or some condition equally as bad, may result.

Experience has taught that, in the nervous and circulatory disturbances following diphtheria and influenza there is nothing as a therapeutic agent that has given as brilliant results as electricity in one form or another. Apparently hopeless cases of paralysis, heart weakness, kidney, liver, lung, and bowel complications, circulatory disturbances, neurasthenia,

and even melancholia, have yielded to the scientific application of electricity when resorted to as a last and only hope. A recent case of considerable importance will be reported here. A lad fourteen years old, the son of one of our prominent physicians, had last winter what was at the time considered a very mild attack of grip. Almost immediately upon recovering from the acute stage, he began to show symptoms of marked cerebral as well as spinal neurasthenia. This condition continued to grow worse until he had become a helpless invalid, and was rapidly approaching a state of melancholia. The father became alarmed as to his mental condition, and had him examined by a famous alienist. After several months, the case was referred to me for treatment. He was brought to my office in a rolling chair and had to be attended and assisted into the office by his nurse, who really never left him. I think I can conscientiously say that it made no difference to the boy where they took him, he would go to one place as readily as another, and whenever he expressed a wish it was to be left alone. The head hung to the right side always and was, when he was moving about, held in his hand. The pupils were widely dilated, and the face always flushed. He complained, when asked, of headache, was rather indifferent as to the mode of treatment; said he really slept. He was placed upon my operating chair straight on his back. The static canopy was lowered over him to such a distance above as in my judgment would about meet the current in his body coming from the earth. The positive side of the machine was grounded, and the negative side attached to the canopy. A mild current was turned on, and, as the current played back and forth to his body from head to foot, the little fellow would fall into the most profound slumber, often sleeping a half to three-quarters of an hour. After about two months' daily treatment, he thoroughly recovered. A number of cases could be reported showing the vitalizing power of electricity on apparently paralyzed centers of the motor and sensory system, as well as the centers of special sense which have been held powerless to act through the toxic influence of influenza, diphtheria, and other acute diseases.

F. B. B.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

- *Primary and Recurrent Mammary Carcinoma Treated by X-ray.* By Wm. J. Morton, M. D., in the Medical Record, May 30, 1903.

The Doctor says: "If, then, we would still claim that the X-ray is as nearly a cure for cancer as any other method of procedure yet found, we must also at the same time admit that from a comprehensive point of view it is certain that it is meeting with cases of certain stages and types which it cannot under present management, and conditions, overcome. While all admit that the more superficial the growth, the greater are the chances of cure—be the case one of epithelioma, of primary, or recurrent carcinoma, or of sarcoma—my own experience furthermore leads me to believe that the newer the new growth is, the more certain will the X-ray act favorably upon it. But as a modification to this view I would suggest that the more preponderant the scirrhus or fibrous character, the slower is the action of the X-ray. When an open ulcer with much secondary septic infection exists the case is almost sure to progress unfavorably.

"In the meantime, looking the field over—taking conservatively into account both successes and failures in my own, as in the reported results of others—I think there is ground for the belief that in the X-ray we possess a relief or cure for cancer, especially in its early stages, which in its ultimate results compares favorably with operative treatment.

"I believe that properly selected cases of primary mammary carcinoma or other cancer may be submitted to the X-ray before resorting to an operation with a certainty that no valuable time will be lost."

The Doctor takes the sensible ground, as neither the operation nor the X-ray are infallible, the status of both should be stated to the patients, and allow them to take their choice. If the X-ray is chosen, and no progress is made, an operation, if one were ever possible, may still be done, and the X-ray continued later on.

"I may say here in general that one class of cases which all have found to be the most resistant to X-ray treatment, and altogether incurable by its aid, is precisely that class of cases which have advanced to a stage where no surgical operation is possible. On the other hand, the X-ray has already cured some of these inoperable cases.

"One fact, at least, stands forth most clearly, and that is that cancerous disease in its incipency, when not too deeply located, is decisively arrested in its growth, and caused to disappear."

"Case No. 1. Mrs. L. M., referred to Dr. Morton by Dr. Fluhrar May 11, 1902. Several months before, the patient had noticed tumor in left breast. The axillary lymphatics were sore and tender. The actual tumor measured $2\frac{3}{8}$ by $2\frac{3}{4}$ inches. Treatment, X-ray high tube three times weekly at nine inches distance from target. Case improved beautifully, soreness and size of tumor both decreased satisfactorily. June 11.—X-ray dermatitis to the extent of the exfoliation of the epidermis, and serous effusion established, but soreness and pain within the breast had long since entirely ceased. Dr. Fluhrar at this point agreed that it was reduced to 1-3 in size. August 16.—Both breasts are about same size; looks very hopeful. During summer, an occasional treatment was given, and Dr. Fluhrar examined her again, and stated there was no tumor or trouble remaining. November 2.—Case dismissed; to all appearance entirely well.

"Case No. 2. May 5, 1903. Miss V. R., age twenty-five. Ulcerated primary carcinoma of right breast far advanced. Disease began two years ago, two weeks after an injury. The right arm is painful, and much swollen with brawny oedema. Had lost thirty pounds in weight during last year. Treatment consists of the use of X-ray high tube, three times weekly, as the usual technique. Treatment relieves pain for about twenty-four hours. Has very little pain in right breast or axilla. June 4.—Severe dermatitis produced. June 16.—Dermatitis disappeared, and skin again sound. Patient feels more comfortable than for a long time. August 8.—Ulcer had now entirely healed, and tumor beneath entirely disappeared. Patient entirely restored to health. Occasional treatment continued to December 6. Whole number of treatments given, ninety-three. These cases show conclusively the healing effect of the X-ray.

"Case No. 3. Mrs. D. P., age seventy. Carcinoma of breast. Size of large goose-egg. Nipple retracted, etc. Tumor of scirrhus type. Entire mammary gland involved. The tumor rigidly adhered to ribs, with glandular enlargement in right axilla. X-ray treatment three times weekly begun. In one month tumor had reduced in size very markedly. By end of second month it was size of small hen's egg, and freely movable from ribs. At the end of third month only an extremely hard mass about $1\frac{1}{2}$ inches to one inch in width remained. He advises that this hard mass be removed, as he considers it only a mass of connective tissue stroma, which it might be impossible to cause to disappear by X-ray. The patient refuses even the

minor operation above proposed. Tumor at last account was about size of small walnut.

"Case No. 4. Mrs. L. H., age seventy. Primary carcinoma between left breast and axilla. March 24.—Examination shows fatty tumor six inches in diameter. Central portion forming hard and disk-like mass. Irregular nodular edges, skin retracted and attached at center. X-ray treatment, usual technique. At end of month all of the comparatively soft and outlying part of tumor had disappeared, while at the same time the central hard mass reduced one-half inch in diameter. All pain and soreness had also ceased. After a fairly continuous treatment of six months the tumor still measured two inches in diameter, and was very movable. The patient felt her age, and was feeble, and on account of distance necessary to travel to and from treatment, an operation was suggested. The tumor was removed, but unfortunately, through mistake, no microscopical examination was made. The operator states it was a carcinoma, but seemed to be degenerated in spots, and the Doctor thinks that the course pursued in this case was correct. Instead of having extensive operation before X-ray treatment to use X-ray first, and then an operation will be insignificant.

"Case No. 5. Primary carcinoma of breast of several years' standing. X-ray treatment, usual technique. Result—disease entirely disappeared.

As a further report of the other remaining fifteen cases would simply be a repetition of the five cases, they will not be included. Dr. Morton is to be congratulated on his painstaking and thorough report of these twenty cases of carcinoma of the breast. They are a standing refutation of the pessimistic critics of X-ray therapeutics.

Epithelioma Under the X-ray. In Preliminary Report of Histological Changes. Dr. V. C. Stewart of Minneapolis, Journal American Medical Association, May 23, 1903.

He cited his findings in the case of a pronounced epithelioma of the back of the hand from which many specimens had been taken. He had them in the pathological exhibit. They showed some very interesting changes which accompanied the growth. First, and most marked, was an extensive and progressive fatty degeneration, which occurred in the nuclei, and in the periphery of the cells in the neighborhood of the pearls. It is well known that these growths have a very poor blood supply, but, as the fatty change progresses, vascularization of parts begins to develop. At first these vessels are filled with red blood cells. Later their place is entirely taken by polymorphonuclear leucocytes. The necrotic changes associated with hyaline degeneration are progressive. Just before liquefaction occurs there is seen to develop a fine reticulum, which fills with leucocytes.

A Case of Carcinoma of Kidney Cured by X-ray Treatment.

By Charles H. Richmond, M. D., New York Medical Journal, May 30, 1903.

The Doctor gives a complete and interesting history of the case by which he arrives at his diagnosis. He gave her daily treatments (five minutes exposure) for nineteen consecutive days. Previously, her temperature had been running from 101° to 102° daily. After the treatment with X-ray her temperature continued normal. Night sweats had become lessened, tumor had ceased to grow, and became softer. Appetite was improved; slept better; circulation and spirits were both improved. She was then sent to Rochester, and put under care of Dr. Weigel. The X-ray treatment was continued. She continued to improve in general appearance, and was soon able to take long walks outside of the hospital grounds. In twelve weeks from the beginning of treatment the tumor had entirely disappeared, and she is at present time, April 1, 1903, at her home apparently as well as before she began to decline.

Results in Radiotherapy. By H. R. Barney, M. D., Journal of the American Medical Association, June 6, 1903.

He gives a very interesting account of his first fifty cases of cancer. Eight were grave and inoperable cases; thirteen were of sarcoma; six were lympho-sarcoma; seven osteo-sarcoma; thirty-seven carcinoma (nineteen of which were epithelioma). He gives the following epitome of the fifty cases:

Cases ending fatally, 10; cases discharged unimproved, treatment discontinued, 5; cases referred for operation, 4; cases improved and still under treatment, 8; cases referred to other operators, 4; cases discharged clinically cured, 19.

The ages of the patients ranged from eighteen to eighty-four, nineteen females and thirty-one males.

Of the carcinoma thirteen were breast cases and all were hopelessly inoperable far advanced cases. Most all were improved, five had been dismissed clinically cured. Of the thirteen sarcoma cases the results were all practically bad. The thirty-seven cases of epithelioma he reports were much better, nineteen of which were of the rodent ulcer type; twelve were clinically cured, being a fine showing for bad cases.

He also reports twelve cases of lupus, ten of which he reports clinically cured and dismissed from treatment. In acne he has had the most gratifying results, there having been no scarring and no pain to amount to anything. He reports one case of keloid, which after three operations for its removal was clinically cured by the X-ray. In eczema he considers it a very valuable adjuvant to other treatment. In sycosis he has had good results. In scleroderma he reports good success. In tubercular glands of the neck he has also had good results.

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Light as a Therapeutic Agent.

W. H. Dalpe, in a clinical lecture before the class in Pharmacology and Therapeutics, University of Bishops College, Montreal, March, 1903, discusses the above subject. He divides the effects of solar radiation upon the human organism into the two classes, caloric or heat effects and chemical effects. Twenty-five years since Downes and Blunt proved that the bactericidal action of light resided in the chemical rays almost exclusively and since thousands of observers have added their quota of testimony to show that bacteria will thrive better in the absence of light or under the less refrangible rays of the spectrum, *i. e.*, the red rays. It is asserted that ascaris lumbricoides (that lover of ways that are dark) does not perceive the red rays, but takes the violet rays for complete light. Finsen's work is fully discussed; his apparatus described. Dalpe states that with none of the apparatus does he believe that the caloric rays are completely eliminated.

With the compressor to render the part to be treated ischæmic, the rays penetrate more deeply and are generally thought to penetrate from one to two inches and even later trials seem to show that deeply situated tissues have been beneficially influenced by them, as is evidenced by the influence upon tuberculosis of the lungs. Emphasis is laid upon the fact that despite the length of sittings, the time necessary for a course of treatment, the inconvenience and work involved, that in lupus vulgaris, for example, it *cures* and is, therefore, worth all the trouble. Dalpe is inclined to believe that the anæsthetic effect is due not to the action of light vibrations, but to the pressure used in making the part anæmic. He states that he is not able to dissociate these factors, but finds the sedative effect very marked. In cancer of the cervix uteri he finds the light of great value in controlling hemorrhage and relieving pain. A New Zealander has devised a very nice way of eliminating heat rays. As the red rays or heat rays are less refrangible he gets rid of them by a parabolic mirror. They are then condensed and focused in the usual way. Dalpe states that even before Finsen's time (Paris inaugural thesis) luminous heat was advocated as a curative agent in a large number of rebellious cutaneous affections.—The Medical Age.

Remark:

The students of University of Bishops College are to be congratulated upon being taught not only the value of light as a therapeutic agent, but the *modus operandi* of its use. This is a move in the right direction. It should be a part of the curric-

ulum of every medical school both for under-graduates and post-graduates. The penetration of the chemical rays without the use of a compressing lens (if it is the chemical rays alone which influence favorably pulmonary tuberculosis) is very considerable, for in the work done by the writer from 1895 in this condition all the radiant energies of the arc without compression of any kind were used and the results obtained compare with the results secured by localization and compression.—Editor Department Phototherapy.

Exclusion of Actinic Rays of Light during Operation for General Peritonitis.

Marshall Clinton finds that the work of Finsen, Rutherford, the Curies, and others has opened up avenues for thought along strange and unexplored paths. Diffused or contracted sunlight is generally considered bactericidal in action. What do we know about the necessity for the presence of sunlight in the development of bacteria? he asks. There is one type of infection—a streptococcus of the skin—which will not occur in the absence of sunlight or actinic rays. This is seen in smallpox, where the secondary pustular period will not develop if actinic rays be absolutely excluded from the patient. Clinton finds the analogy between this condition and the one about to be described as strong as between the curing of lupus and tubercular peritonitis by the action of sunlight. He states that cases of general acute peritonitis often present themselves, in which the symptoms of the patient are not at all in proportion to the actual condition present. They are seen forty-eight hours after the onset and may show only a slight elevation of pulse and temperature above the normal. When these patients are opened, washed and drained they promptly drop into a state of septic collapse from which they do not rally. Has not the effect of the operation been to stimulate in a terrific manner a very severe infection? Based upon the analogy that seems to exist between these cases and smallpox, he suggests that such cases should be operated in a clinic where the actinic rays of light are excluded and red bulbs only used.—Annals of Surgery.

Acne Rosacea and Phototherapy.

Phototherapy has advanced the treatment of this condition very considerably, and Finsen has met with success from this method even in severe cases, which had lasted for a long time. Macreide gives an account of eight cases treated by him in this manner, in all of which a good result was obtained. In the beginning he used short sittings for fear of scarring, but finding that such was not the case he exposes the patients for half an hour or more as in lupus. On these lines he has cured in two to

three weeks cases of acne rosacea which had resisted severer methods for months.—London Lancet, April 18, 1903.

The Ignition of Ether Vapor in Presence of a Closed Electric Light.

Dwight H. Murray reports that on the 19th of January, while engaged in a difficult and tedious operation his attention was taken from his work by a sudden flash of light and quick movements on the part of his anæsthetist. He found that the ether vapor had ignited, scorching the hair and eyebrow of the patient and had burned the skin on the forehead sufficiently to cause a marked redness. The anæsthetist reported that being unable to see the pupil distinctly, the patient lying face downward, he turned on the electric light in order to more readily note the reaction of the pupil. The blaze was coincident with the turning on of the light. Murray states that he has never seen any such accident reported and cautions operators not to turn electric lights on or off near the vapor of ether, particularly in a small room. In the above instance there was no exposed fire or blaze in the operating room. Upon attempting to repeat the condition experimentally he found it impossible. While his experience may not be unique it certainly is rare and the surgeon should bear in mind that it is a possibility. He concluded that ignition took place from the spark in the electric light burner made when contact took place from the turning on of the light.—New York Medical Journal and Philadelphia Medical Journal, June 27, 1903.

A Finsen Light Hospital for Chicago.

An institution for phototherapy, or healing by light, will shortly be opened in Chicago by Dr. Wellington T. Stewart and Dr. J. H. Stewart, who have been in Copenhagen, studying Dr. Finsen's methods.—New York Medical Journal and Philadelphia Medical Journal, June 27, 1903.

Remarks on the Red Light Treatment of Smallpox.

Finsen states that it may be considered an irrefutable fact that daylight and especially the chemical rays has a most injurious effect on the course of smallpox, as the suppuration of the vesicles is due to the effect of light. Light has no effect on the infection, and death from smallpox cannot be prevented by excluding the chemical rays, but the avoidance of suppuration is most important as the suppurative stage is most dangerous and the greatest number of deaths are due to suppuration. As smallpox is a disease in which the public health authorities oblige the patient to go into a particular hospital, he has the right to ask that he shall not there unnecessarily be exposed to dangers that may be fatal or that may disfigure him for life. The private physician will be guilty of gross shortcoming if he does

not exclude all daylight as soon as his diagnosis is made.—New York Medical Journal and Philadelphia Medical Journal, June 6, 1903.

N-Rays.—Following upon his discovery that light of high refrangibility and conspicuous penetrative powers has been found to be emitted from X-ray tubes, M. Blondlot has discovered a new kind of light to which he has given the name of "N Rays" after the University of Nancy where the work was carried out. This promises to be of great value as soon as means have been devised for making use of its peculiar properties. These rays were first discovered by the effect produced upon small electric sparks in air and were obtained from a Roentgen Ray tube. They penetrate aluminum, black paper and other materials, as do Roentgen Rays, but they can be reflected and refracted, though they exert no photographic action. Since the first discovery M. Blondlot has found that they were given off by other bodies, such as silver of talc heated to redness and an ordinary circular glass flame burning without a chimney. He has found that they can be detected by their action upon a phosphorescent screen of calcium sulphide, as this shows a notable increase of phosphorescence under their influence, but they do not initiate it. They also affect incandescent gas, so that a small body of this shows an increase in luminosity.—Editorial, Electrical Review, June 27, 1903.

A New Crop of Radiations. N-Rays.

It should be reiterated that these new and remarkable rays are unmistakably light, although their exact wave lengths have not yet been determined. They are reflected, refracted, and polarized by the usual means, are brought nicely to a focus by a quartz lens and are totally reflected at the incidence required by their refractive indices. Yet they penetrate most opaque substances almost as freely as the X-rays and produce most as powerful effect on electrical discharges. They work up to a longer distance from the source than the penetrative radiations usually studied and are not under the least suspicion of being ions, electrons, emanations, effluvia, auræ, or any other queer and unusual things. The discovery of this group seems to be of a very high order of importance. Their study will be a revelation in the general theory of radiation, and their unusual properties will serve to broaden the current conceptions of transparency and opacity, as well as the view of the inter-relations between radiant energy and electrical actions. The peculiar value of M. Blondlot's discovery lies in its dealing with things which have a direct and comprehensible, even if unclassified, relation to the general theory of radiant energy.—Editorial, The Electrical World and Engineer, June 27, 1903.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

*The Emotions as Related to Disease.** By R. A. Roberts, M. D.

An emotion is the moving of the mind from a specific cause, manifested by some sensible effect on the body which, if carried to extremes or repeated too often, through bad environment, lack of training, or lack of will power, may produce acute or chronic changes not only in the skin, but also in every muscle in the body, and in all internal organs; and may also result in acute or chronic mental or physical disease, terminating in death or recovery. By observing the visible effects of emotion, we may be guided in assuming the character of those which are invisible. All through life the human face is a living picture of the varying conditions of the soul. Pain, pleasure or astonishment may not only be seen here, but also in the movements and postures of the body. The ear may tingle from the shaft of slander and the skin may be drenched by the desire for revenge. Sorrow suffuses and inflames the eye, and vision itself is debased by depression. Irritability of the renal system, shown by phosphaturia and polyuria, may arise from the irritated mind, while the mouth and the meatus will "water" from feelings of animal desire. Nervousness will parch the lips, and timidity will loosen the bowels, while maternal impressions may result in deformities, blemishes or death of the offspring.

The language expressive of the effects of emotion is also of value in guiding us in the processes of disease. We hear of the "chills running down the back," of the acts that are "blood-curdling," or of the "ragings," the "boilings" and "creepings of the blood," and such like expressions of what may be experienced when the mind is stirred by certain events; and, likewise, how often we, as physicians, know of diseases that well might be ascribed to such chillings, thickenings and congelations which are often overlooked as producers of such conditions, as vaso-motor disturbances, stasis, thrombosis, catarrhs, influenzas, fluxes and suppressions, with their sequelæ of lung, genital, mastoid and brain affections.

Poetry assures us of the halo of celestial light, the music in the air, the perfumed breath of love, the touch that turns to gold, and many other fancies as some would call them; but they cannot well be overlooked, for the power behind such subtleties must be reckoned with by those who would successfully practice the art of healing the sick.

It is the language of the street, that the heart may overflow, or that it may be full, torn, burst or broken by emotion, and

* Abstracted from the California Medical Journal, May, 1903.

while these lacerations, ruptures, dilatations and regurgitations may be difficult to prove in a scientific way, nevertheless, that these expressions are based on pathological realities is as true as it is interesting.

If from intense anxiety the hair can turn white, and if fright can instantly cause death, it can be assumed that pus may form in the tissues without any outside assistance whatever.

There must, indeed, be some undiscovered power capable of producing those prohibited septicæmias and those hot and cold abscesses which are ever in evidence. 'Tis true we may be told that diathesis and cachexia are causative factors in these, as well as in gout, rheumatism and other affections, but the explanation is an evasion, and only tends to confirm the idea that the emotions may be as well put down as powerful in the etiology of these affections, which are neither infections nor traumatisms.

There are things, says Iago :

" The thoughts whereof
Doth like a poisonous mineral gnaw our vitals."

In a fit of anger a stop is put to digestion, and the functions of the liver and pancreas are in abeyance; peristalsis is gone and impactions begin. Constipation and auto-intoxication hold sway. The appendix is distended and becomes a dangerous receptacle; it loses its yielding and gliding nature and is pushed to the wall in the crush—overwhelmed, bruised and broken.

Nature rebels in reverse peristalsis, while the kidneys come to the relief of the bowels; but the task is too great and they suffer corrosion in the effort and become albuminuric and desquamated. The vitiated portal circulation carries ruin to the liver, whose ducts and outlets are choked and inactive. Thus we have from vicious emotion, through inspissations and poisonings, a life hanging in the balance, between nature and the surgeon's blade on the one hand and death or invalidism on the other. Twenty per cent. of all dead-house examinations (Allbutt) show the vermiform appendix to have been diseased. We find the symptoms preceding death from acute nostalgia and other forms of violent grief, to be: excitement, depression, and persistent anorexia. The nervous shock sets up malnutrition followed by ptomaine poisoning, and changes are found in the tissues, similar to the fatal effects resulting from infections and mineral poisons. Changes of a fatty, granular, and parenchymatous nature are found in the organs, and the pancreas and liver are the seat of capillary hemorrhages, while bile may be found in the stomach.

Emotional girls and young women commonly suffer from palpitation of the heart with slight enlargement of the thyroid, and slightest of all—a hint of the bulging eye of exophthalmos—giving us altogether a perfect miniature of Graves's disease,

which is often the result of prolonged mental depression or grief which again is charged with producing cancer, diabetes, and acute yellow atrophy of the liver, not forgetting the close association, in this class of patients, between fright and chorea, despondency and gastric ulcer, melancholy and globus hystericus.

Intense emotion occurs in those who lead anxious lives. In an attack the face is pale, the extremities are cold, and the pulse is miserable. The arterial system in politicians, gamblers, and stock-brokers is in a state of chronic hypertension.

There is tension by perpetuation, and repeated spasm, resulting in sclerosis and atheroma, which in turn gives the open door for angina pectoris, apoplexy, and aneurism. Admitting the truth of these conclusions in regard to the relation between baneful emotions and disease, it follows that in this line of thought lies a field for useful investigation. It is a realm where arrogant science must often give way to the power of docile eclecticism; it is a domain mastered by the true physician, who may also be looked upon as the friend and counselor of those who are sick.

As regards treatment: the first indication is to separate the patient from all conditions creating mental disturbance. And if the dictum of John Hunter be borne in mind, that,—“as the state of mind is capable of producing a disease, another state of it may effect a cure”—we can still further be guided in our remedial measures. The physician will fail, however, if he simply puts his trust in mind-cures; and failure none the less will be his lot if he rests his faith in drugs.

Clinically there are three stages: Excitement, depression, and exhaustion. In the first we use mild saline sedatives, with rest in bed; in the second, eliminants and mild vegetable stimulants; in exhaustion, tonics, nourishing food, massage, and useful avocations.

Alcohol and opiates are dangerous as they produce unhealthy emotions; and the so-called sympathy of friends is a harmful foe, for while it diffuses whatever is wrong, it also deepens it.

ANNOUNCEMENT.

AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

Preliminary Programme. (Subject to Change.)

The thirteenth annual convention will be held at the Hotel Windsor, Atlantic City, N. J., on September 22, 23, and 24, 1903. The rate will be \$3.50 per day for each person. These terms apply to members of the families of members of the

association and their friends, who are brought to the hotel by reason of the convention.

The regular hotel stage carries passengers from the railroad station to the hotel at 25c. per person. There are also plenty of hacks and conveyances of all sorts available for this purpose.

Rooms may be reserved by writing to the proprietor, Mr. G. Jason Waters, Hotel Windsor, Atlantic City, N. J., and will be held in the order in which the written reservations are received. It would be well, therefore, for those intending to come, to secure their rooms well in advance of the meeting.

Trains leave New York for Atlantic City at short intervals, over the Pennsylvania Railroad, West Twenty-third Street Station. Price of ticket \$4.75. This ticket is good for return any time within fifteen days after date of sale. Any further information can be secured by addressing the secretary.

The attractions of Atlantic City are so well known that any description is entirely unnecessary. Those who desire to combine pleasure with the regular business of the association will find no difficulty in employing their time satisfactorily, as the excursion ticket permits a stay of fifteen days. Ample time, therefore, will be given those who desire to avail themselves of the opportunity of becoming familiar with Atlantic City and its environs.

The attractiveness of the scientific programme, which follows, speaks for itself.

FIRST DAY, TUESDAY, SEPTEMBER 22, 1903.

Morning Session.

Registration of Members.

9 o'Clock.—*Executive Session*; 10 o'Clock.—*Scientific Session.*

Reading of minutes of previous meeting; Addresses of welcome and responses; Reception of Honorary Fellows and Guests; Communications; Address of President; Report of Committee on Arrangements; Resolutions.

REPORTS OF STANDING COMMITTEES.

On Induction Coils and Alternators, by Margaret Abigail Cleaves, Chairman.

On Electric Light Apparatus for Diagnosis and Therapy, and the Roentgen Ray, by William Scheppegrell, Chairman.

On Electrodes, by R. G. Brown, Chairman.

On Meters, by Robert Reyburn, Chairman.

On Cataphoresis, by Fred Harris Morse, Chairman.

On Static Machines and Condensers, by William Benham Snow, Chairman.

On Constant Current Generators and Controllers, by William James Herdman, Chairman.

On Current Classification and Nomenclature, by William Johnson Jenks, chairman.

On St. Louis Exposition in 1904, by William Benham Snow, Chairman.

Papers.

"Electrotherapy as a Specialty," Alfred William Bayliss, Buffalo, N. Y.

"Currents of High Frequency, Apparatus, and Therapeutic Uses," Francis Goodwin DuBose, Selma, Ala.

"The Effects of the Secondary Static Currents in Removing Albumin and Casts from the Urine," Boardman Reed, Philadelphia, Pa.

"Some Principles upon which is Based the Use of Electricity in Nervous Diseases," Alfonso David Rockwell, New York, N. Y.

"The Use of Electricity in the Treatment of Diseases of the Heart," Sigismund Cohn, New York, N. Y.

"Electricity in the Treatment of Diseases of the Stomach," Harvey Hamilton Roberts, Lexington, Ky.

AFTERNOON SESSION, FIRST DAY, 2 O'CLOCK.

Exhibition drill of the crew at the Life Saving Station.

3 o'Clock.—*Scientific Session.*

"Electricity in the Treatment of Chronic Deafness," George Z. Goodell, Salem, Mass.

"Employment of Static Electricity in the Treatment of Nervous Diseases," William Benham Snow, New York, N. Y.

"Electrical Treatment of Trachoma and Corneal Opacity, with Illustrative Case," Margaret Abigail Cleaves, New York, N. Y.

"The Successful Treatment of Eighteen Cases of Granular Lids by the X-ray and High Frequency Vacuum Electrodes," Albert C. Geyser, New York, N. Y.

"A Year's Work in Electro-Therapy," Laura Viola Gustin-Mackie, Attleboro, Mass.

"The Treatment of Urethral Stricture, and Fissure of the Anus by Electrolysis, with Report of Cases," John Clark Luke, Ocilla, Ga.

SECOND DAY, WEDNESDAY, SEPTEMBER 23, 1903.

9 o'Clock.—*Executive Session*; 10 o'Clock.—*Scientific Session.*

Problems in Electro-Therapeutic Practice: a General Discussion. Members are invited to submit difficulties, arising in practice, on which information or advice is desired, and to offer suggestions as to the solution of such problems.

Papers.

"Treatment of Tuberculosis, with Report of Cases," Russell Herbert Boggs, Pittsburg, Pa.

"The X-rays in the Treatment of Tuberculosis of the Throat," William Scheppepegrell, New Orleans, La.

"The Roentgen Ray in the Treatment and Cure of Cancer, Lupus, Rodent Ulcer, and Eczema, with Histories of Cases Treated," Elijah Wilkinson Smith, Terra Haute, Ind.

"The Use of the X-ray in the Treatment of Malignant Growths, with relation of Cases," Marcus Morton Johnson, Hartford, Conn.

Twelve o'Clock.—Visit to United States Signal Station.

AFTERNOON SESSION, SECOND DAY, 3 O'CLOCK.

Scientific Session.

"The Position of the Roentgen Ray and Ultra-Violet Light in the Therapeutics of Malignant Diseases of the Uterus and Adnexa," Margaret Abigail Cleaves, New York, N. Y.

"The Type of Cell and Pathological Features of Carcinoma which Do not Respond to X-ray Therapy," William Leroy Kenney, St. Joseph, Mo.

"The Present Status of X-ray Therapy in the Management of Cancer," Clarence Edward Skinner, New Haven, Conn.

"The Use of Galvanic Electricity in the Treatment of Cancer and Kindred Diseases," William Winslow Eaton, Danvers, Mass.

Executive Session.

Election of Officers, 9 o'Clock, P. M.

Reception given by the medical profession of Atlantic County, N. J., and the Academy of Medicine of Atlantic City, N. J., to the members of the Association and guests at the Marine Room, Hotel Windsor.

THIRD DAY, THURSDAY, SEPTEMBER 24, 1903, 9.30 O'CLOCK.

Scientific Session.

"Radio-histo-fluorescence," William James Morton, New York, N. Y.

"Cataphoresis," James C. Gill, Chicago, Ill.

"The Roentgen Ray as an Aid in Diagnosis," Herman Grad, New York, N. Y.

"Perineuritis," Almerin Webster Baer, Chicago, Ill.

"Nerve Health and Nerve Debility: the Effect of the Actinic Rays upon Tissues," Albert E. Sternes, Indianapolis, Ind.

"Retrospect of the Second International Congress on Electro-Therapeutics at Bern," Robert Newman, New York, N. Y.

Members of the medical profession are cordially invited to be present.

WE are pleased to announce the consolidation of the New York Medical and the Philadelphia Medical Journals. These two able contemporaries uniting their forces will give the readers of medical literature a publication unrivaled in this or any other country.

We congratulate the editors and managers upon having successfully effected this strong consolidation.

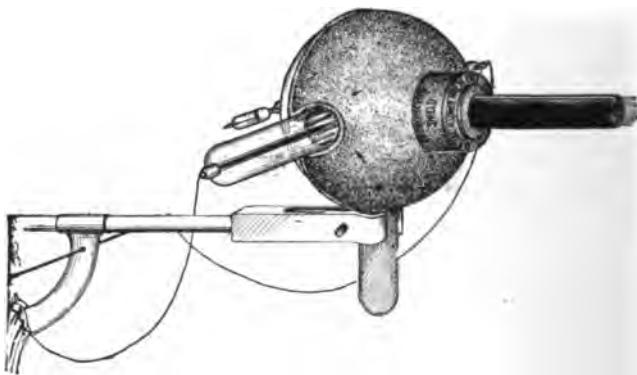
NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

THE R. F. SHIELD FOR X-RAY TUBES.

R. Friedlander & Co., of Chicago, Ill., have been granted a patent upon an ideal shield for protecting the operator as well as the patient from the X-ray.

The shield is of composition, perfectly opaque to the X-ray, light in weight, and completely envelopes the tube where



X-rays are emitted. It is constructed (Fig. 1) so that different-size openings are allowed, and the operator is enabled to focus the ray upon any desired spot or area. Figure 2, shows the shield placed upon the tube when in use.

The shield is so constructed that sparks cannot jump across to the patient, nor is there any danger of puncturing the X-ray tube. The extensions are of hard rubber, which allow close contract to the part treated, no sensation whatever being experienced.

The Journal of Advanced Therapeutics

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SEPTEMBER, 1903.

No. 9.

THE THERAPEUTICS OF THE CONTINUOUS CURRENT.

BY MARGARET A. CLEAVES, M. D., NEW YORK.

INTRODUCTION.

It is not the purpose in these pages to discuss diseases *seriatim*, on the contrary the effort will be made to present fundamental principles in such a manner as to enable the general practitioner to apply them to the needs of patients as they arise. In no instance will an empirical application in a given condition be advised. The therapeutic applications of electricity must be governed by the same laws which apply to other therapeutic measures, whatever their nature, whether surgical, medical, mechanical, or referring more particularly to matters of hygiene. In order to administer opium, mercury, or quinine for example, in an intelligent manner, it is necessary in the first place to have a clear idea of the pathology underlying the given condition, and in the second a knowledge of the properties of these drugs, their physiological action, and the dose necessary to meet the indications. The same is true of the scientific administration of all physical agents in the treatment of disease.

With this knowledge there is no difficulty in making an intelligent prescription to meet the requirements of the case, save in so far as the personal idiosyncrasies of the patient magnify or modify the action. This is a thing which has to be learned in the therapeutics of electricity just as in other therapeutic measures. The physician who peruses these pages with the expectation of finding a definite formula for a definite condition is sure to be disappointed. No effort, however, has been spared to so clearly establish principles that in their perusal there will be found, not only the rationale of the therapeutic

application of the current in a given condition, but the rationale for its therapeutic application in any condition. The value of electricity is no longer questioned by the intelligent physician who recognizes in it an agent capable of doing good work in the tissues of the body, promoting oxidative processes and tending to the establishment of nutrition.

That everything depends upon the point of view goes without saying. It is therefore necessary in establishing our point of view to remember (1) That the body of an animal is in itself the seat of electric currents; (2) That these currents exist, not only during the abnormal or diseased condition of different parts of the body, but also in the normal conditions of the body. (3) That electric currents when sent through the body of an animal, are capable of producing marked effects therein, the character of which depends upon the nature of the discharge. (4) That the passage of an electric discharge through a nerve, muscle, or indeed through any organ of the body of an animal, produces an alteration in its functional activity. (5) That a sufficiently powerful discharge through the body of an animal may produce death.*

Much contumely and disrepute has fallen upon the use of electricity in medicine because of the fact that it has been administered in an empirical way and that it not only has been, but still is to a considerable extent, in the hands of unqualified persons. With a knowledge of its physical laws, its physiological action, and its therapeutic application, it is doubtful whether there is any one other agent capable of the same good. On the other hand, however, a great deal of harm may result, owing to a lack of this knowledge, prejudicing as well the development of scientific methods. The widely differing opinions as to the therapeutic value of electricity held by members of the profession are due to ignorance of electro-physics and physiology, and unanimity of opinion concerning its value as a therapeutic measure and the results obtained from its use will only come when every member of the profession approaches it with the same fundamental knowledge.

No greater mistake can be made than for the physician to use electricity without this knowledge, unless it be to advise patients to "get a battery" and use it for themselves. The same phy-

* Houston and Kennelly: "Electricity in Electro-Therapeutics"—2d ed., page 9-10.

sician would hardly advise his patients to get opium, mercury, or nitroglycerine and take the one or the other. On the contrary, he would write his formula with the greatest care and give explicit directions as to its administration.

Advice of so indiscriminate a nature is just as wrong and unscientific in the one instance as the other. Nor should the administration of electricity be left to the nurse or the layman who chooses to take it up. For its successful and scientific use the highest intelligence and training of the skilled physician are required. The time is here when a thorough knowledge of electro-physics, physiology, and therapeutics is demanded of every student presenting himself for graduation. Without such knowledge he stands on the threshold of his life's work greatly handicapped by his inability to use intelligently one of the most powerful and efficient therapeutic methods known to medical science. The need for a thorough training in the fundamental principles of electro-physics, not only on the part of the medical student but the practitioner as well, cannot be too strongly insisted upon. It is not necessary to go into the subject exhaustively as does the physicist and the electrical engineer, although just so far as it is possible to broaden one's knowledge of electro-physics and electro-physiology, in just so far will better, more satisfactory, and more scientific work be done. Research in the field of electro-physiology these past few years as well as now, and also the increased attention to the therapeutics of electricity, demonstrates that these subjects are rapidly being rescued from the quacks and charlatans who have used them for so many years as their happy hunting ground.

Too vigorous a protest cannot be entered against the practice of keeping the several departments of science apart. It is impossible to pay too great attention to the department of physics, the elucidation of which should go hand in hand with the study of physiology and physiological chemistry. Daily does the truth become more and more apparent that no true conception of the life processes can be attained, and no real advance effected, until electricity and chemistry are recognized as inseparably bound to that which is often designated as the science of life.

No attempt has been made in the following pages to quote from the extensive bibliography extant on the subject of electro-therapeutics, for the reason that the work is intended

for the use of the general practitioner and is the outcome of a large clinical experience. It is meant to be entirely practical and to prevent confusion, different methods and the work done by different observers is not given in detail.

There is, however, a good deal of valuable literature upon the subject, in which the student may from time to time be interested, and in an appendix at the close of the volume a list of books is given. In almost every instance the writers of these books are qualified, by reason of their experimental knowledge and clinical work, to speak with authority upon the general subject of electro-therapeutics.

Nor has time been taken to discuss other therapeutic measures and their value as compared with the therapeutic applications of the electrical current.

This is not to be understood as implying a lack of value on the part of other measures, but simply to point out in a positive way the pathological states in which an expenditure of electrical energy has been found to be of value and the manner of its use.

Nor, again, has it seemed expedient to cumber these pages with a discussion of theoretical views, no matter how fascinating, nor with the detail of fundamental electro-physics.

The physicist is the fittest person to handle this subject and in "Electricity in Electro-Therapeutics" * the needs of the busy practitioner are admirably met.

Subsequent to a brief consideration of Electro-Motive Force, there will follow a discussion of (1) The Current, Its Effects and Physiological Action; (2) Influences of the Current Upon Nutrition and Inflammations; (3) The Expenditure of Electrical Energy, Including Influences of Current Distribution and Current Density; (4) Applications of the Current, General versus Local, which will include a consideration of all percutaneous methods; (5) Hydro-Electric Applications: (a) General Hydro-electric Applications, (b) Hydro-electric Applications to Accessible Mucous Cavities; (6) Applications to Mucous Membranes and Skin with Metal Electrodes and Needles; (7) Cataphoric Medication and Metallic Electrolysis; (8) Electro-Diagnosis; (9) Apparatus, Types and Selection

* "Electricity in Electro-Therapeutics," Houston & Kennelly. The W. J. Johnston Co., 253 Broadway, N. Y.

of, and (10) General Technique. The importance of the continuous current in therapeutics is the only apology offered for taking it up by itself.

CHAPTER I.

Continuous Electro-Motive Forces.

In order to discuss intelligently the therapeutic applications of electricity, the first thing to recognize is its fundamental characteristic, viz., pressure. It is by reason of this characteristic that useful work is done in the tissues, just as by its expenditure useful results are secured in the industries, arts, and sciences; for example, in electric lighting, electric welding, and electroplating. Here are utilized the luminous, thermal, and electrolytic effects of the current; effects which, in common with others, are in constant use by the physician who uses electrical energy as a therapeutic measure. This pressure in electro-technics is known as electro-motive force, abbreviated E. M. F. Or, in other words, electro-motive force is the name given to that unknown force or pressure which produces or tends to produce an electric current, and the presence of current in any circuit necessitates the existence of an E. M. F.

Broadly, electro-motive forces are either continuous or alternating. The voltaic or primary cell, and also the secondary cell, will produce an E. M. F. which, so long as the chemicals remain unchanged, does not vary in strength. Such an E. M. F. is, therefore, called a continuous E. M. F. It may be produced by a thermopile and by a continuous-current dynamo. Continuous E. M. F.s are divided into steady and pulsating; and alternating E. M. F.s into symmetrical and dissymmetrical.

The steady type of a continuous electro-motive force is one that is produced by voltaic batteries or thermo-piles, and the pulsating type is such as is obtained from a dynamo electric machine.

Briefly, it may be stated here, although not pertinent to the subject under discussion, that the dissymmetrical type of an alternating E. M. F. is characteristic of a Ruhmkorff coil or of a medical induction coil. On the other hand, symmetrical alternating E. M. F. waves are produced by alternating-current dynamos or alternators such as are used for light and power,

and medically in the form of an inductor alternator commonly known as a sinusoidal apparatus.

A continuous electro-motive force produces, or tends to produce a continuous current while an E. M. F. that alternately and periodically reverses its direction is said to be alternating; and the latter produces, or tends to produce, an alternating current. A continuous current is sometimes called a *direct current* in contradistinction to an alternating electric current, which, like the E. M. F. producing it, changes its direction at every half cycle.*

Frequently the objection is raised that the current from a continuous current dynamo is not fit for medical work because of its pulsating nature. This, however, in practical work is not found to be an objection, for in all well-constructed dynamos the pulsations are so slight as to be little, if at all, felt. A use of the current extending over a period of years, from the Edison incandescent street mains, with a volt-meter constantly in circuit, has demonstrated conclusively that such is the case. The volt-meter needle during five hours of consecutive work (comprising the office hour) never varies or fluctuates in the slightest degree. This current, however, has in common with all dynamo currents slight pulsations which can be appreciated by means of a sensitive telephone. They are, however, of no disadvantage in therapeutic work. On the other hand, dynamos of less good construction give a current of marked pulsations, indicated by constant fluctuations of the volt-meter needle and perceptible to the patient because of the distinct mechanical action resulting therefrom, and there is a class of cases for whom this pulsating type of current produces a better effect than the steady type because a mechanical action is superimposed upon the chemical action of the current, as, for example, in inflammatory exudates about the articulations of joints and sheaths of tendons.

On the other hand, there is a large class of cases in which it is most undesirable: for example, in all delicate work upon the eye, nose, throat, ear, within the urethra, uterus, and in epilation and the treatment of skin conditions.

* The reader is referred to "The Report of the Committee on Current Classification and Nomenclature," for detailed definitions, with illustrations, of the different forms of currents and how produced: "Transactions Am. Electro-Therapeutic Association," September, 1902; *Advanced Therapeutics*, January, 1903.

The selection of the type of continuous E. M. F. for medical work is a matter very largely dependent upon the location. In a city like New York, for example, where the law requires the placing of electric wiring underground, the various adapters for use with dynamo currents from the street can always be used and are to be preferred over and above batteries composed of chemical generators or cells. In other places, however, where the wires are above ground and where there is danger of wires conveying a current of high E. M. F. or pressure crossing the system in use in the physician's office, there is an element of danger in the use of adapters connected with the incandescent current of the street mains.

This danger does not proceed from the E. M. F. (110 volts) in use, but in the possible event of an accident to the wire conveying the full E. M. F. of a high-pressure system. It is very slight (but it exists however) and adapters are in use all over the country without the interposition of any especial controlling device.

The current produced by a continuous E. M. F. is known among physicians almost exclusively as the *galvanic* current, and its use is often spoken of as *galvanism* and *galvanization*. This nomenclature is unscientific. The electrical engineer knows nothing of the galvanic current. When using a continuous E. M. F., the current produced in the working circuit, no matter what its nature, is known as a continuous current, and it detracts naught from the honor due Galvani to adopt a scientific nomenclature. Confusion will exist in the minds of medical men and progress will be impeded so long as electro-therapists use an unscientific and meaningless nomenclature, a nomenclature loaded with the names of men who, in most instances, have simply observed and applied the well-known and classic phenomena of the various electro-motive forces. In this presentation of the subject, then, it must be borne in mind that the term galvanic current will never be used and that the phrasing *continuous current* will take its place. And in so far as it is necessary, in a discussion of continuous-current phenomena, to speak of alternating currents, the dissymmetrical type of an alternating E. M. F., commonly known as faradic, will always be referred to as an induced current, or better magnetic-induced.

CURRENT DIFFERENTIATION.*

Illustrated by a Case of Peripheral Neuritis, due to Parenchymatous Degeneration of the Cord.

BY A. D. ROCKWELL, A. M., M. D.

Formerly Professor in the New York Post-Graduate Medical School and Hospital, Electro-Therapist to the Woman's Hospital in the State of New York, etc.

Every drug in the pharmacopeia has undoubtedly some therapeutic value, and if when prescribed it hits the mark, well and good.

Unfortunately, however, it is pretty well understood that many, if not the majority, of remedies, including those prescribed and self-administered, fail in their special adaptation to the case in hand. If this is true with drugs, it is even more so in the application of electrical forces. As with the former, therefore, so with the latter; in order to get the best results that electricity is capable of giving, we must rightly adapt the remedy to the disease.

For this reason I have always held that to correctly differentiate between the various manifestations of electricity and select the form most suitable, is one of the most important and difficult problems in electro-therapeutics. If we wish for mechanical effects, we select currents of alternation, of to and fro motion. All currents undoubtedly yield physical effects, but for chemical effects only currents giving a considerable amperage are applicable, while physiological effects, like physical ones, are excited by every possible manifestation of electricity. The three effects that we term mechanical, physical, and chemical, or electrolytic, as is well known, are not peculiar to living bodies. They are observed on both the dead and the living, on inorganic and organic bodies, although they are more or less modified by vitality.

Physiological effects, on the contrary, take place by virtue of the vital properties of the body; they cease when life ceases, for they are mainly the modification of the vital processes by electricity.

* Read before the American Electro-Therapeutic Association, September 2, 1902.

We can readily understand, therefore, that physiological effects must be in many respects more important than the others.

Currents of enormous potential have undoubtedly widened the sphere of usefulness of electricity in the development of physiological phenomena, and yet I very much doubt whether they excite any really new physiological effects. The fundamental idea of the therapeutics of electricity is its nutritional influence, which we have known and obtained for many years. We get these nutritional effects because of the influence of electricity on the circulation, on the excretory and secretory processes of the body, and on absorption.

There is no form of electricity but what has a certain influence in these directions, yet, for the purpose of increasing general nutritional activity, exciting metabolic changes and developing the potential energy of the cell life, it seems to be the general consensus of opinion that in these currents of high frequency and potential we have an energizing principle superior to the other electric modalities. But while welcoming the new, let us not forget the old, but remember that the magnitude of these high potential currents is practically nil, and magnitude or amperage is in a multitude of conditions absolutely essential.

In the following case this fact was strikingly apparent, and my object in presenting it is threefold:

First—As an illustration of a form of neuritis somewhat unusual as to its course, distribution, and pathology.

Second—As an excellent example of the necessity of careful differentiation in the selection of the proper form of current.

Third—Because of the prompt relief afforded after the failure of all other methods.

The history of the case renders it quite evident that the pain was traumatic in origin, whatever toxic complications might have arisen subsequently. It seems reasonable to believe also that the pathologic result of the injury was a condition of neuron degeneration of the lower cervical and upper dorsal regions of the cord, but a condition still susceptible of ready regeneration.

I venture to give the case in some detail, and as the patient was himself a practitioner of medicine, a man of much intelligence and who had consulted many physicians, this account of the symptoms and progress of the disease becomes of special

interest and value, I give the history very much in the patient's own words:

Case. Dr. ——— came to me April 2, 1902, through the kindness of Dr. G. F. Morris of this city. The patient had led an active outdoor life and in general had enjoyed excellent health, with the exception of one attack of acute bronchitis, fever and ague, and several attacks of "la grippe." No disease of a specific character. The peculiar chain of symptoms to be described, covering a period of eighteen months, had led to the following diagnosis, viz., lumbago, rheumatism, uric acid diathesis, indigestion, movable kidney, intestinal obstruction, pericarditis, angina pectoris, spinal concussion, spinal congestion, neurasthenia, and hysteria.

The summer of 1900 was spent in Europe, and for several months he indulged in the use of wines moderately and smoked six or seven cigars daily, both habits contrary to his custom when at home. While trout-fishing in one of the brooks near Loch Lomond he met with an accident, almost dislocating the left shoulder joint and so violently stretching the median and external thoracic nerves as to produce great pain and partly to deprive him of the free use of that hand ever since.

In October, 1900, after his return home, he spent an hour in the tan bark ring and on dismounting he could scarcely move because of great pain over the lumbar and sacral region, and the weak condition of his legs. A hot bath and cold shower relieved him for the time being. The next morning found him so much worse that it was with great difficulty only that he could assume the extreme dorsal position or rise from his bed. The symptoms gradually increased in severity so that it became difficult to determine the diagnosis as between rheumatism and concussion of the spine. Treatment was directed to these symptoms by the administration of phosphate of sodium, friction to the spine with thuja terebinthinate, and ironing with a hot flat iron. Relief followed and riding was again resumed, but with little exhilaration or comfort. In April, 1901, he was attacked at intervals with severe pains in the cardiac region, extending down the left arm and simulating the pains of angina pectoris. Dr. S. Dana Hubbard and other physicians then carefully examined him without finding any evidence of organic disease.

The pains were attributed to indigestion with gases distending the stomach. The patient himself repeatedly applied the stethoscope with negative results. The various organic digestive ferments were tried without effect. Thinking that the digestive disturbance would be benefited by exercise, the patient resumed his horseback riding, until the pains became so severe that he lost all control of his mount. Riding was then permanently discontinued, with relief from pain. In July the anginal pains again so increased that he could not walk two hundred feet without an unbearable paroxysm over the left chest and down the left arm. A minute's rest would give relief, followed by a feeling of complete prostration.

The pain, which was formerly located in the sacral and lumbar regions, now shifted to the dorsal and cervical regions. The paroxysms so increased in intensity and frequency that they often numbered from twelve to twenty during the night, following the least movement of finger, hand or arm, or the slightest change of position. During the paroxysms the pulse was usually full and between 70 and 80 per minute. Ironing the back with a hot flat iron or the administration of brandy gave more or less relief. Morphine was not used, but opium suppositories simply relaxed the entire system, increasing the weakness and prostration next day. The extreme heat of summer aided in producing insomnia. The month of August was spent at Mt. Kineo, Maine, where the temperature was rarely above 70 degrees F. and more frequently 56. The cool atmosphere and the quietness gave rest and relieved the insomnia, although the pectoral and brachial pains continued. Outdoor life improved the general health, but the use of an eight-ounce fly-rod engendered a neuritis of the right ulnar nerve. While at Portland a paroxysm was treated with a hypodermic of 1-50th of a grain of nitroglycerine with apparent benefit, but on repetition signally failed. A consultation with Dr. John Nutt resulted in the conclusion that the circulation of the spinal cord was at fault and digitaline was added to the treatment to help push the blood through the arterioles. The treatment now consisted of digitaline, grain 1-50; strychnine, grain 1-30; and nitroglycerine, grain 1-50. Six weeks of this treatment gave no permanent relief. The gastric fermentation was much relieved by occasional doses of carbolic acid, C. P. five drops, in

a glass of hot water. On the return journey by steamer, during a paroxysm of excessive severity, a physician on board, finding the pulse nearly normal, pronounced the case one of hysteria. In the words of our patient, "Ye gods! what a diagnosis. It was the last straw to break the camel's back." Subsequently, Dr. Robert T. Morris made a thorough examination and finding no apparent structural change of any kind, pronounced the trouble neurotic and referred him to a specialist for treatment by electricity. For six weeks static electricity was administered by varying methods, but with no pronounced benefit. At the same time a combination of calcium, glycerophosph., sodium bromide, potassium iodide, potassium nitrate, wine of colchicum seeds, etc., was prescribed and faithfully taken for six weeks, producing the characteristic iodide and bromide acne and coryza, but without avail. For a time a dose of two ounces of brandy gave relief for three hours, but finally lost its effect and was discontinued altogether. In his extreme desperation to get relief the patient at the same time took treatment by hydrotherapy. This treatment consisted of a fifteen-minute sweat in a cabinet with head exposed, followed by douching with the water at a temperature alternating from 134 degrees to 60 degrees F., at a pressure of from 25 to 30 pounds. This treatment gave at first marked relief but, finally, like all previous methods, failed altogether. He now applied to his friend, Dr. J. E. Stillwell, some time in January, who agreed with Dr. Graeme Hammond, whom he had also consulted, that the cause might be one of spinal congestion.

Thompson's solution of phosphorus was prescribed and, for a time, with seeming benefit, but played havoc with his stomach and he was wild with pain again. This disturbance was corrected with a preparation of hydrogen dioxide.

From August 1, 1901, he had subjected himself to a rigid diet, excluding all sweets and desserts and using only saccharine for coffee. This was done to arrest the excessive intestinal fermentation. During October the red meats were excluded from the diet and finally he lived on milk alone exclusively. One morning, on awakening with a paroxysm, he felt the abdomen distended as if by a hard mass. A careful examination with abdominal muscles relaxed, resulted in the conclusion of either intestinal obstruction or a growth. Believing that the

transverse colon was distended beyond normal, an enema was administered and gave relief for a time, but a tumor could still be felt. The patient lived on three pints of milk a day in order to facilitate an examination by someone more expert than himself. Dr. Charles McBurney made the examination but found nothing abnormal. In the words of the patient, "Since July, 1901, I have not been free from these excruciating pains in my chest, arms, and spine, although quite comfortable when absolutely quiet. The slightest exertion brings on a paroxysm. The character of the pain is like a muscle cramp, increasing with motion and ending with a sensation of great heat in the epigastric region." Failure with the foregoing remedies and no definite results from static electricity or hydrotherapy, the following remedies were used: Cerevisine, on the theory of certain French physicians, of a reflex disturbance caused by the presence of staphylococci and other bacilli in the alimentary tract, Fowler's solution, amyllum iodatum as alteratives; salicylic acid with colchicine as an anti-rheumatic—all these were hopefully resorted to and as hopelessly abandoned. The pains were now even increasing in severity, and influenced by an article of mine on the use of the combined currents that he had recently seen, he consulted me in no very hopeful mood.

The details of treatment are simple and soon told. The cathode, three by four inches in dimension, was applied successively to the solar-plexus and region of the left pectoral muscle, while the anode of a dimension of three by three inches, was applied by the slow labile method to the cervical and upper dorsal regions of the spine, and occasionally to the left shoulder. The applications were daily, the strength of current from twenty to fifty milliamperes, and each séance of about ten minutes' duration. Within a week there was a marked improvement and by April 29th the pain in the spine, epigastric and pectoral regions had almost entirely disappeared. The pain in the arm, although greatly lessened and the power of motion much increased, still persisted to some extent. At this time a large and painful carbuncle developed on the neck of the patient, greatly prostrating him and resulting in a sudden return of all his former distress. The treatment was, however, still kept up along the same lines until June 1st, when the pain had practically disappeared from over every affected area.

In considering this interesting case, the question arises: On what principle did galvanization succeed after the failure of both static electricity and the faradic current? Undoubtedly, to my mind, the success was due to the greater quantity or magnitude of the modality employed and to its peculiar electrotonic properties; and the rationale of its effects is explained by its superior vasomotor influence, with consequent relief of blood pressure and improvement in nutrition of the degenerated nerve cells. And yet this effect of circulatory drainage and relief of pressure is seen with other forms of electricity. The curative effect of the static spark in peripheral neuritis and the influence of high tension faradic currents in conditions of local congestion are well known. In this case, however, the real seat of the difficulty was central and deep-seated, and the results of treatment rendered it quite evident that the determining factor in reaching the causation and resolving the pathological condition upon which depended the peripheral disturbance was amperage rather than voltage.

It has not been my purpose in this paper to enter into any elaborate discussion of the indications for the use of the various manifestations of electricity, but rather to call renewed attention to the importance of the subject. Every form of electrization has had its boom as it were. Who does not recall the controversies between the followers of Duchenne, and Remak? One preferred the galvanic, another the faradic current, and heated arguments were held as to whether the better effects were obtained by the applications to the motor points or to the muscles themselves. In this country static electricity, and in France especially the high frequency apparatus of D'Arsonval, are having their booms, so to speak.

This is all very well, so long as we do not subordinate the judicial faculty to impulse and desire, or relegate to the back-tailed.

grounds methods of administration because of the trouble encountered. As Dr. Lewis Jones has well said, "If we wish to do our work scientifically our motto should be measurement, measurement, measurement,"—so if we would get the best and quickest therapeutic results, our motto should be differentiation. Not only must we strive through theory, practice, and experience to adjust electric modalities to pathological conditions, but the personal equation in each case should receive due consideration. Some patients react better to one electric modality, while others suffering from the same apparent pathological condition, and for no apparent reason, react better to another. Idiosyncrasy, here as elsewhere, plays its part, so that no matter for what form of electricity we may have a preference, the all-round electro-therapist, supplied as he should be with every necessary variety of apparatus, will frequently have occasion to call in the aid of each.

RHEUMATOID ARTHRITIS.*

BY FRANCIS B. BISHOP, M. D.

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Rheumatoid Arthritis is a progressive disease of the nervous system, due to faulty metabolism, affecting primarily the centers and nerves that exert a trophic influence upon the tissues of the body, and is characterized in the early stages by a torpid condition of the entire muscular system, a general feeling of fatigue with a sense of soreness, pain and stiffness of the extremities, especially of the fingers, wrist, knees, and ankles. This is followed later by febrile attacks of greater or less severity, each attack leaving in its wake some deformity, until very often we find the patient in the chronic stage: deformed in nearly every joint, with changes in the cartilage and synovial membranes, muscles wasted, limbs fixed in flexion and suffering great agony, with a degree of helplessness proportioned to the stage and severity of the disease.

You will be spared the trouble of following me through the various chronic stages of this disease, they having been discussed in a former paper. Your attention will be called to the early stages of what you have perhaps already noticed has been designated as a disease of the nervous system. The writer makes no claim to priority in defining it as a nervous disease, but we can come to no other conclusion after a careful study of its onset, progress, and course. When in the first stages, often during childhood, the symptoms make their appearance in the same joints and muscles on opposite sides of the body. In others, first on one side to be followed shortly, in the same member, on the other side. Frequently they appear simultaneously on both sides. The attacks come on with paroxysms of pain, some tenderness and stiffness of the muscles and joints, followed sometimes by relief for a time, which is, however, hardly ever

* A paper read before the Medical Society of the District of Columbia, Wednesday evening, May 27, 1903.

complete. These symptoms are preceded or followed by digestive disturbances; the patient also showing symptoms of anæmia and emaciation. Each attack reduces his resisting power, and each time leaves him more helpless until he gradually passes into the chronic and deformed state in which we so often find him. Or perhaps the patient may go on for years with only slight discomfort and break down suddenly, as a result of some nervous shock or after some acute disease, which may assume the form of what has been generally known as rheumatic fever. In any event, the trophic disturbances are well marked, in the wasting of the muscles and other changes (often amounting to destruction) as in the cartilages and in the synovial membranes. Loss of tone in the skin and ankylosis of the joints are also observed.

What is true in the beginning is true in the progress of the disease; a muscle or set of muscles are wasted on one side, we find pretty much the same condition in the same muscles or set of muscles on the other side, showing that the centers exerting trophic influence over these muscles and joints are primarily involved, and that the symptoms, as we see them, are merely manifestations of a deep-seated nervous disease. That the nervous system exercises a trophic influence over muscles, blood-vessels, bones, the viscera and other tissues is generally conceded, but whether there is a special set of trophic nerves having their individual centers and fibers, or whether the trophic influence is exerted by cells in the anterior cornua, or through the sympathetic ganglia, the writer is not prepared to say, but is inclined to the belief that the function of nutrition is exercised by the vaso-motor nerves through the direct influence of the sympathetic. The close relation of these two systems of nerves and the close association of their spinal centers with the cells of the grey matter of the anterior horns of the cord has led him to this belief.* The vaso-motor center lies in the gray matter of the floor of the first ventricle; the vaso-motor nerves travel down the lateral column of the spinal cord and terminate by arborizing around the cells of the gray matter of the subsidiary vaso-motor centers. From these cells fresh axicylinder processes originate, which pass out as the small medullated nerve-fibers in the anterior roots of the spinal nerves. The

* Kirke's "Hand Book of Physiology."

vaso-constrictor nerves for the whole body leave the spinal cord by the anterior roots of the spinal nerves from the second thoracic to the second lumbar, both inclusive. They leave the roots by the white rami communicantes and pass into the ganglia of the sympathetic chain, which lies on each side, along the front of the vertebral column. Here are situated cell stations on the course of the vaso-constrictor nerves for the head, trunk, and limbs. The small medullated nerve fibers terminate by arborizing around the cells of these ganglia, and a fresh relay of axis cylinder processes from these cells carry on the impulses.

The vaso-dilator nerves pass through these ganglia, but do not communicate with cell stations in this sympathetic chain. They retain their medullary sheath, and have their cell stations in the collateral ganglia (such as the semilunar) or in the terminal ganglia, on the walls of the blood-vessels themselves.

This simply shows that there is an intimate anatomic relation and perhaps associated physiological function between these three great systems of nerves, and it seems reasonable to imply that they have more or less influence over nutrition. Therefore, as the disease under discussion is characterized by faulty nutrition or lack of nutrition in the early stages and in all stages, we must naturally seek repair by an effort to stimulate to action those centers through which the trophic influence is transmitted.

An early diagnosis is very important, as in all chronic curable diseases the sooner a diagnosis can be made and proper treatment instituted, the more certain and perfect will be the cure.

The following case came under my care from the State of Maryland, in a very advanced stage of the disease. The history will be given to show how early in life the disease often begins and how slowly and progressively it marches on. This case has been reported before and is used now on account of its early history.

Mrs. X., when eight or nine years of age, suffered with pains in the limbs and back. These were thought to be growing pains. No special treatment was deemed necessary; it was suggested best to wait and let nature assert itself. When about fifteen the joints commenced to enlarge. Her physician prescribed different rheumatic remedies without any benefit to the patient. At this time stomach trouble was added to her other discomforts,

which she attributed to the medicine prescribed. She had several attacks of the grip; after each attack she said her rheumatism grew worse until finally every joint in her body was affected. Her hands were so drawn as to be closed, arms were quite crooked and knees bent. Her case was pronounced incurable and she was told to do all she could to make life comfortable. She was very much emaciated, the extensor muscles generally in a relaxed and wasted condition, and when coming under my care was thirty-seven years old.

We find that at eight or nine years of age this patient began to suffer with pains in her back and limbs, no doubt she had other indications of approaching disease even earlier which were passed by unnoticed. At or about the age of fifteen, or about the time that nature demands of the female all the nervous and nutritive energy at her command to bring about those physical changes which distinguish the girl from the woman, the joints commenced to enlarge and stomach trouble appeared. From this time on she grew steadily worse, until at the age of thirty-seven she was deformed in nearly all the joints, with hands drawn in claw shape, elbows and knees bent, joints stiffened, jaws fixed to such a degree that it seemed surprising that she could get enough food in her mouth to sustain life. This patient was quite delicate as a child, caring very little for the really nutritious food, but ate largely of pastries, candies, pickles, and sweets of all kinds. If you will kindly follow me through the composition of nerves and muscles, I think that we may find good cause for this wonderful trophic disturbance, not only in this case but in many similar ones. The nerves, according to "Kirke," are composed of water in large quantity. Of the solids one-half is proteids in the gray matter and one-third in the white matter.

Muscles contain seventy-five per cent. of water, twenty-five per cent. of solids; of this twenty-five per cent. of solids, eighteen per cent. are proteids. Therefore as it is necessary to maintain metabolism of the body in a state of equilibrium, and as this can be done only by furnishing the body with food necessary to its perfect nutrition, it is easy to see why a growing child, deprived of proteids, should have starved nerves, as well as a depraved muscular system.

Again, a predisposition to this disease may be inherited. The

writer is quite familiar with the circumstances in the family of a very successful business man, a flour merchant and miller. The father, one daughter, one son, and a granddaughter have died with what has been called rheumatism but to-day would be known as rheumatoid arthritis. The daughter was confined to her bed for over forty years and for many years before death her knees and chin were drawn together; every joint in her body ankylosed; she was blind and deaf. A son now living at the age of fifty, moves about with difficulty. The mother and two daughters seem to be exempt. The mother is still living and is over ninety years of age.

Either in the acquired or inherited tendency, the patient may live on comfortably for a number of years and break down when the nervous system is subjected to some unusual strain.

In the female, the first changing period of life will often precipitate an attack and bring to light for the first time the true nature of the disease, or this period of life is often passed in safety and the disease will come on in full force during or after a confinement.

Some of the cases we are called upon to diagnose early in the adult are in women who either have never borne children or have successfully passed through the child-bearing period. With these, at, or just before the last great change in their lives, the nerve energy begins to fag, and we notice symptoms of faulty metabolism. They complain of stiffness in the joints, especially at nights, when pain is very prominent. In the morning there is a general lethargy and indisposition to take exercise; they are always tired, muscles weak, sometimes with nodes on the finger joints, pain and stiffness in the toes. Even at this stage there is a tendency for the flexor muscles to contract. These patients are usually in good flesh and sometimes uncomfortably fat. We must remember, however, that a person may be very stout and yet be starving for proteids.

We may notice all through the history of this disease from one extreme of life to the other that it is usually bilateral and manifests its greatest energy in one of the three periods of a woman's life in which her nerve centers are put to the greatest possible test, in maintaining a perfect nerve stamina.

Before taking up the subject of treatment it will be well to inquire somewhat into the physiology and composition of that

most important of all the fluids of the body, from a metabolic point of view, the lymph.

As the blood circulates through the capillaries, some of its liquid constituents exude through the thin walls of these vessels, carrying nutriment to the tissue elements. This exudation is called lymph; it receives from the tissues the products of their activity, and is collected by lymph channels which convey it to the thoracic duct. Lymph comes into much more intimate relationship with the metabolic processes in the tissues than the blood. The spleen is the only organ in which the blood comes into actual contact with the elements of the tissues. Lymph is similar in composition to blood plasma, and contains six per cent. of solids, more than one-half of which are proteids.

The blood plasma contains of solids about ninety-seven parts per thousand; of this amount there is about eighty-two per cent. of proteids. Thus we see that all the tissues of the body, fluid and solid, most actively engaged in carrying on the process of metabolism, seem to depend very largely for their activity upon nitrogen. Hence in a chronic tissue-destroying disease, like the one under consideration, it seems a reasonable proposition, that food, rich in this constituent, should be given to the patients. They should be instructed to drink freely of pure water, and should, as far as practicable, be deprived of starchy food, sweets, and to a large degree of fats.

Cold baths and too frequent bathing should not be allowed, because the former abstracts too much body heat and too frequent hot baths tend to exhaustion. Bathing in tepid water sufficiently often to keep the body clean is all that is necessary.

Medicine can do but little good and tends to increase the stomach disorder. An occasional hepatic stimulant, however, is sometimes advisable.

Exercise in the open air should be encouraged, but not to the point of fatigue.

Of all therapeutic measures up to the present time, none have produced as good results as electricity when administered with a due consideration of the temperament of the patient, and a clear idea as to the changes to be brought about. A knowledge that it is necessary to influence certain nerve centers and the kind and degree of current that will best stimulate these centers, to produce the desired results, is an important

consideration. This can best be obtained, according to the experience of the writer, by a stimulation of the centers, already referred to in this article, which occupy a position on each side, in front of the spinal cord.

When a mixed nerve is subjected to inductive shocks, at the rate of one per second, the vaso-dilators are stimulated and the parts supplied thereby are suffused with blood, this causes an exudation of lymph through the capillaries, bathes and feeds the parts, in other words increases metabolism; and in the joints where the cartilage has no blood or nerve supply, and is depending altogether for nutriment upon the lymph, this becomes a matter of great importance.

It has furthermore been proved by "Drechel" (Kirke's Physiology) that the experiments, outside the body, which most closely imitate those occurring within the body, are those in which strong alternating currents were passed through solutions of proteid-like materials. Their effects are a rapidly changing series of small oxidations and reductions and are analogous to metabolic processes. Under such circumstances the carbon atoms are burnt off as carbon dioxide, the nitrogen being split off in the form of ammonia, and by the union of these two substances, ammonium carbonate is formed. In addition to a carefully regulated diet, the writer has for a long time treated these early cases of rheumatoid arthritis, upon the general physiological principles outlined.

During the administration the patient reclines upon a flat couch, face down, with arms and hands either hanging over the side or lying by his side, and the muscular system is as thoroughly relaxed as possible. An electrode, made for the purpose, is then pressed between the vertebræ on each side, and a surging high potential alternating current is administered. The time and length of the waves are measured, to suit each case, from one to ten pulsations per second. As the joints and muscles of the four extremities are involved I go carefully over the whole range of ganglia on each side, five or six times; after this the liver is treated, the region of the kidneys and the spleen, and the lymphatic vessels and gland as well as the joints. One peculiarity about this surging current, alternating in character, is that it produces a very efficient and deeply penetrating spark that is practically painless. The hand placed upon the knee, the spark may be sent through any part of the

hand and be felt to enter the knee and still not produce pain. These treatments should be given daily until a decided improvement takes place. The first intimation of improvement will often come from the patient. They nearly always feel better after treatment. The improvement is gradual and progressive, but even in the early stages of the disease months will be required to bring about a cure.

My object in writing this paper is to show the necessity of early diagnosis in these cases. To show that impaired nutrition is primarily the cause of trophic changes; first in the nerve center, second in the nerves, and third in the muscles and joints. That these changes are brought about in many cases, at least, by lack of a sufficient amount of proteids in the daily food supply. And last but not least, that any treatment to be successful, must be based upon a knowledge of the decaying physiological functions, and the best means of aiding nature, in restoring them to the normal. If I have even partially succeeded, or if I have succeeded in awakening a thought, in the minds of any of you, though your views may be widely divergent from the theories outlined here, that will bring forth one physiologic or therapeutic fact that will bear the test of time, I am amply repaid.

Discussion.

Dr. J. B. Nichols expressed appreciation of the paper. The theory that the affection is infectious has not yet been corroborated. It must be ascribed to abnormality of metabolism, or nervous influences, or both. Perhaps one is dependent on the other. The association of joint lesions with affections of the nerves has been demonstrated beyond question: as an illustration may be mentioned Charcot's tabetic arthropathy. The theory is interesting, and it is possible that treatment along this line might prove effective.

Dr. C. H. A. Kleinschmidt agreed with the essayist that trophic nerves, as such, have never been demonstrated. The lesions in rheumatoid arthritis are due to nutritive changes of a katabolic (breaking down) character, which depend upon disturbance of the functions of the vascular nerves. Even the accumulation of much fat, in chronic cases, is pathological and the result of katabolism, the fat being of no use whatever.

He did not doubt that incipient cases can be benefited by electricity; but electricity cannot act upon the trophic nerves specifically, as there are no such nerves. It takes months to cure even an incipient case by electricity. The patience ex-

hibited by some of these patients is remarkable. He knows of an unusually severe case: the flexors were involved, but not the muscles of the face; the patient's limbs are drawn out of shape, his body is bent, and he cannot perform many of the acts necessary for ordinary comfort; yet he is one of the most cheerful men Dr. Kleinschmidt has ever seen, and with his pipe enjoys life.

Dr. S. S. Adams was gratified at the results reported by Dr. Bishop from the use of electricity. It would seem, however, that while the dilatation of the vessels must have a beneficial effect upon nutrition,—and some effect is better than none,—yet the effect would hardly be lasting, owing to the brevity of the séances. He asked for information on this point. One disadvantage which the physician has to contend with is the skepticism engendered in these patients by their previous experience with various methods of treatment. It is hard to make a diagnosis in the early stages, at the very time when treatment can do the most good. He deprecated the common practice of ascribing joint pains in children to "growing pains." After marked anatomical changes have occurred, the diagnosis is of course easily determined. The mere presence of nodes, however, is not pathognomic; he has had many patients thirty years of age and upward, who have had nodes of gouty or rheumatic origin, but not rheumatoid in character. In order to present convincing proof, Dr. Bishop should report a series of cases in which he has stopped the process—relaxed the fixation, etc. He himself knew of no help of any kind for these patients.

Dr. Kleinschmidt pointed out that it is a mistake to speak of increasing the blood supply of a part by stimulating the vaso-motor (vaso-constrictor) nerves. The effect of stimulation is to cause contraction of the arterioles: to increase the blood supply it is necessary to dilate them: this is done by stimulating the vaso-dilators.

Dr. F. P. Vale said that he was much interested in the paper, particularly as to the kind of current used. Three years ago, Dr. Morton, of New York, was very enthusiastic over the results obtained in this disease by the use of the "wave current" which he introduced into electro-therapeutics and which justly bears his name. The French, who introduced currents of high tension and high frequency, refer to this current of Dr. Morton as belonging to this category. He asked Dr. Bishop to describe in detail the current he spoke of, and its method of application.

Dr. G. N. Acker said that unfortunately he had had several of these cases. One patient could move only the fingers. He was glad that Dr. Bishop offered a method of treatment, as he himself knew of none. Like Dr. Adams, he could not see how the séances could have any permanent effect because they were so brief. The diet can be regulated to good advantage in the

early stages, but unfortunately the disease is hard to make out at this time. He hoped that the method of treatment described by Dr. Bishop would prove successful.

Dr. Kleinschmidt stated that some weeks ago he treated an old gentleman for bronchial catarrh. His right arm and hand were absolutely fixed. He treated the catarrh, and incidentally gave him a mixture containing the salicylates; the next day he could move hand and arm all right. Last week he saw a lady who could not move a limb; he gave her the same preparation, and the next morning she was ready to come downstairs. He gave it to a third patient a few days ago, and she is now nearly well. These are facts. The medicine does not disturb the stomach in the least.

Dr. Acker called attention to another prescription, which is said always to cure these cases; it consists of ext. taraxici fl., acidi salicylici, and liq. ammonii acetatis.

Dr. George M. Kober asked whether any difference had been observed when animal proteids and when vegetable proteids are administered. Experiments in the Prussian Army have shown that the best diet for a healthy individual is that in which two-thirds of the proteids are vegetable, and the rest of animal origin. The old idea that an exclusively animal diet causes diseases of the urino-poietic system appears to be sustained by experience. What proportion of the proteids taken by these patients should be vegetable, and what proportion animal appears to be a question of great practical value.

Dr. Bishop, in closing the discussion, said that the terms *anabolism* and *katabolism* were spoken of in his paper as metabolism; a consideration of tissue waste and tissue repair separately would necessarily have made his paper much longer.

He does not claim to stimulate trophic nerves, as is clearly stated in the paper, that he does not believe that it is definitely known what set of nerves produce trophic effects, but experience has taught him that when the ganglia of sympathetic which forms a chain on each side of the front of the vertebral column are stimulated, nutritional effects are produced in the extremities.

In answer to Dr. S. S. Adams, he said, that when nature is given a chance the general tendency of disease is toward cure. Now if we can by proper food supply the system with what it needs in the way of nourishment and stimulate the devitalized nutritional centers to increased activity, there is no reason why nutrition should not be established and permanently remain.

The subject of the history of the case reported in the paper was almost a confirmed cripple, and he regreted that he neglected to bring reprints showing cuts of the hands and arms before and after treatment in this case. The patient had not seen the inside of her left hand for eleven years, the right hand was as bad but not quite so useless. She walked with great

difficulty. Could not get the hands to her head. Now she goes when and where she pleases; combs and washes her hair; opens and shuts the hands and suffers no pain. The hands of course are still somewhat deformed, but she can use them quite readily.

Other cases that had been cured were mentioned.

He admitted that the diagnosis in the early stages was sometimes difficult, but with the care that should be given to all cases, it ought to be made.

In the female it usually begins in one of the three great periods of her life—the first change or beginning of the menses, child-bearing period, or at the menopause. In the male the period of election is not so well marked, nor is the disease as common as in the female.

Numbness and pain in the arms or legs, hands or feet, is at first and for a long time complained of, by the patient with a tendency to stiffness at times, especially in the smaller joints and is bilateral. The salicylates do no good. Many of these patients on account of the condition of the stomach consult stomach specialists, and some of the cases have been referred by these specialists to him.

A long course of treatment extending over months and sometimes years are necessary to effect a cure. He mentioned the case of a lady about to be discharged as cured; she is about forty-two years old and has been under treatment for over a year.

Nodes on the fingers and knuckles are not pathognomonic. He had seen very few cases with nodes. They are more apt to be gouty. He believes, with Dr. Acker, that we would find very few intelligent physicians of to-day ascribing children's disorders to growing pains. However twenty-five or thirty years ago, this was not the case, children were often told and their parents, too, that the child only had growing pains, or that they need not worry—that the child would outgrow the pain.

He wished to state emphatically that these cases were not altogether desirable at any stage, and in order to get good results it required hard and persistent work on the part of the physician and much confidence on the part of the patient.

In answer to Dr. Vale, he said that the current referred to was not what is described as the "wave current." It is an alternating current, and it can be obtained through an induction coil and Leyden jars. In answer to Dr. Kober's question, he said that he gave lean beef; it is easily obtained and easily digested. These patients are starving for proteids; hence he gives it to them in quantity, with plenty of water.

ANSWERS AND OBJECTIONS TO DR. A. A. O'NEILL'S PAPER, "X-RAY ERA," JULY NUMBER, ON ELECTROLYSIS IN URETHRAL STRICTURES.

BY ROBERT NEWMAN, M. D.,

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In the July number, 1903, of the *American Electro-Therapeutic and X-ray Era* appears a flourishing article by A. A. O'Neill, M. D., of Chicago in which the author wishes to show that electrolysis cannot be successful in the treatment of urethral strictures. We only agree with him, that it needs an expert operator in that particular line to succeed, and neither myself nor anybody can be made responsible for blundering attempts. A good surgeon may not be an electro-therapeutist and utterly fail with electrolysis for want of experience and knowledge of the first principles of physics and chemistry. The writer, in his articles, has often warned that persons who do not understand the method, and have only heard or read about it, should not attempt the performance of electrolysis. It is impossible to illustrate here in a limited space the fallacies of the paper, and it must be stated here, that the success of electrolysis in the treatment of urethral strictures is certain and fully established, for which the writer offers the following facts and quotes the statements of others as follows:

The following is from an editorial in the *New England Medical Monthly*: *

"Not long ago, physicians and surgeons of repute flouted the treatment of urethral strictures by electrolysis. Now it is

* "What Is the Present Status of Electrolysis in the Treatment of Urethral Strictures?"—*New England Medical Monthly*, December 15, 1887.

so generally and successfully practiced that scarcely anyone opposes it. This change of opinion is undoubtedly due first to the better understanding of the electrolytic treatment as distinguished from galvano-caustic.

"The successful treatment, without relapse, of a large number of cases is fully reported by many physicians of high repute."

"It is undeniable that the method now adopted was first grasped and put forward by Dr. Robert Newman of New York, who, despite the misrepresentations and abuse of the ignorant, has zealously labored for eighteen years, to perfect the instruments used and the technique of the operation until by extraordinary success the most skeptical are convinced. Experiments in the treatment of strictures with electricity have been made since 1847, and until 1872 without any method, except such as destroyed tissues by too strong currents. Mallez and Tripier called their method galvano-caustic, showing that they used a current with caustic, not electrolytic action, and therefore they naturally failed.

"The present method is electrolysis, with weak currents applied at long intervals, resulting in galvano-chemical absorption, known and recognized as Newman's method. Newman also introduced and perfected instruments for use in the operation so that failure in the operation is hardly possible."

In England, eminent surgeons so fully comprehend and acknowledge the great value of this method, that it is taught at the medical schools as one of the ways of treating urethral strictures. In St. Bartholomew's Hospital an additional department has been established for treatment in this way, and many successful cases have been reported by Drs. W. E. Steavenson and W. Bruce Clarke.*

"Like all of his recent papers, this one of Dr. Newman's is interesting, and there are a considerable number of men who share his views and approve of his method."

Dr. G. N. Rohe, Baltimore, said: †

"Dr. Robert Newman of New York has been the most prominent advocate of the method, but the treatment by electrolysis has won for itself a place in genito-urinary sur-

* Medical and Surgical Reporter, Philadelphia, June 8, page 695.

Editorial—Medical and Surgical Reporter.

† Atlanta Medical and Surgical Journal, July, 1888, page 296.

gery which it will maintain. The evidence in its favor is too strong to be ignored."

Dr. W. E. Steavenson * says, Cantal gives in his text-book the subject particular attention, and says on page 76 "during the last decade it has been developed and improved by Dr. Robert Newman of New York to such an extent that it has now become one of the recognized modes of treatment of strictures." In his book he gives a full description and the success of electrolysis of stricture on pages 76, 88, 91, 116, 149, etc., and also in the treatment of gynecological cases.

Debedat † and many French surgeons conclude that electrolysis is a truly curative procedure as regards urethral strictures, which are by it attacked alone without injury to the healthy urethra. None of the cases hitherto observed have called for further surgical treatment.

Dr. C. S. Neiswanger's remarks at a clinic in Chicago ‡ at the Illinois School of Electro-Therapeutics—"organic strictures located in any part of the body can be successfully absorbed by electrolysis. There is a certain technique laid down for the treatment of these cases by my friend Dr. Robert Newman of New York, and I find that just as long as I follow that technique just so long do I have results similar to these recorded by Newman. Just as soon as I deviate from it I do not have the same good results."

Editorial—Charlotte Medical Journal:§ "If, however, an operator is ignorant of the technique and instruments he certainly is liable to do all the mischief possible."

Similar remarks from editorials and authors could be quoted ad infinitum, and it certainly proves that many have had success with electrolysis in urethral strictures.

Now, a few words of the writer's statistics. He has used his method of electrolysis for thirty-six years and cured thereby 2500 cases, without having heard of a failure or relapse. He also, years ago, compiled 1755 successful cases in the practice of fifty-four different operators ||

* "The Uses of Electrolysis in Surgery," by W. E. Steavenson, London, J. & A. Churchill, 1890.

† British Medical Journal, January 22, 1898.

‡ The Medical Standard, 1900, and The Critic, September, 1902.

§ January, 1903.

|| Times and Register, Philadelphia, April 8, 1893.

In the same number of the Journal in which this was published, appeared an editorial from which the following is quoted:

"The statistics accumulated by Dr. Newman would cover a list of over 2000 cases of urethral stricture treated by the electric method. In the face of such a mass of positive evidence, one is tempted to explain the dissent existing by the application of the personal equation. Still, everyone has his right of opinion and free expression, and if the opponents of this method desire it, the columns of *The Times* and *Register* are equally at their service." No statements of dissent have been made.

Statistics each of series of one hundred cases have been published in detail with documentary evidence. These statistics, letters, and documents have been investigated by a special committee. This committee have pursued their investigations for nearly a whole year, very carefully and impartially examining the documentary evidence, read the letters concerning it, corresponded with former patients and their physicians in America and Europe. The final report made in the transactions of the American Electro-Therapeutic Association for 1893, page 40, was, verbatim, as follows:

"We have examined the records of Dr. Newman's cases and regard his conclusions as well sustained by the statistics, and as far as our experience in this line of work adds further testimony it is confirmatory of the value of the continuous currents in resolving a large class of urethral strictures, etc."

This report is signed by Drs. A. H. Goelet, Wm. J. Morton, New York, and W. J. Herdman of Ann Arbor. That under some circumstances some medical critics throw doubt on the correctness of the statistics appears almost a willful libel. Many of these patients have been kept under observation, and have been re-examined after years, and no relapse followed. Most of these, after twenty-five years' interval, can be found to-day stating that they have been kept well without having had a relapse. In a few instances, a patient returned after years with a new ailment, mostly of the prostate or bladder, but never had a stricture in the same place, which had been cured by electrolysis. During these years, the writer has never lost a patient by death while under treatment for a stricture. Death, however, followed in every instance when a patient gave up

the electrolytic treatment by the writer for the sake of undergoing an urethrotomy, which in these cases was never performed by the writer. Dr. F. B. Bishop of Washington, D. C., has reported more successful cases in the *Virginia Medical Monthly*, June, 1893, in which he says: "After a constant experience of eight years, I am thoroughly convinced that the treatment of stricture of the urethra by electrolysis is the best method now known to the profession." In another part of that article Dr. Bishop says: "Dr. Newman of New York has used this method about twenty-six years, and during that time he has treated numbers of cases with uniform success. Leading surgeons throughout the country have been severe in their criticisms of Newman's method, and have cast a shadow of doubt upon the claims of Dr. Newman. On the other hand, he has been supported by many men of prominent standing in the profession, both in this country and in Europe who have taken the trouble to become familiar with the method and have practiced it successfully. Some of the critics, I think, have been unfair to Newman, inasmuch as they are hardly inclined to give him credit even for sincerity in the report of his cases cured, but content themselves with a wholesale condemnation of his method, because they have tried it a short time and failed to cure their cases."

This should be evidence sufficient to establish the success of electrolysis in the treatment of urethral stricture. The writer will refrain from aggressive personalities in treating a strictly scientific subject, but defend himself against the unjust attacks made by Dr. A. A. O'Neill. On page 240 is a statement that dissolution of tissue is the result of chemical galvanocaustic. That is true when improperly done. If properly performed, however, any caustic effect must be avoided, and the technique conducted in such a manner that only an absorption is caused without a caustic effect. Next he speaks of an irritation, which the writer has always advised operators to avoid.

The dangers described on page 242 can only occur in the experience of a tyro, and never with an able expert. Inexperienced practitioners should never attempt an operation they do not understand. The tirade about cicatricial tissue on page 243 is superfluous, as the writer never has spoken of it in his articles, nor caused cicatrices. Their removal is an art, which may be accomplished only in certain cases and by experts.

This, however, is not under consideration. On page 244 is an insinuation as though the writer claims the invention of electrolysis. On the contrary, he has given a full history and wonders that any practitioner is ignorant of the effects of electrolysis, which are described in every text-book on physics. He has mentioned all the efforts made in that direction, but certainly claims the originality of his method, technique, and the instruments made for the proper execution of the method.

The language of Dr. O'Neill is extremely unfair and insulting, and if he had read former articles of the writer he could not have made those statements. On page 245 are similar unfair statements. We will not discuss the experiments of Dr. O'Neill. The cases he reports are the most unfair statements that can be imagined, and cannot be convincing. The patients have all been under treatment with electrolysis by other practitioners, and they may have been good surgeons, but he does not show that they understood the effective technique of electrolysis in the treatment of strictures or in gynecology. In the very meager history of the cases, we find one case of a probable prostatic disease. Case 2—Troubles may be caused by a catheterization. In case 3, an undue force has been used. Case 4 was treated for a long time by two different operators. Case 5 appears to have been handled badly. This as well as some of the following are gynecological cases, which to consider would be unfair and take up too much space. Next Dr. O'Neill assails the writer's veracity in a case reported by Dr. Tuttle, which many lawyers may declare a criminal libel. The reader may be informed that the specimen in question of a former rectal stricture, operated by the writer was presented at a meeting of the N. Y. Pathological Society, and all the members present on that occasion did examine it, and found it as represented. Hence, it is reported accordingly in the minutes of the Society.

It is beyond comprehension how a gentleman could make such unfair and deliberately insulting statements. There may be another object and the writer does not feel inclined to throw dirt or to be personal in scientific matters. The unbiased will conclude that electrolysis as a chemical absorption is a fact, which will and must succeed in the treatment of urethral strictures.

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THE ELECTRICAL TREATMENT OF A CASE OF FIBROID UTERUS WITH DISEASE OF THE RIGHT OVARY AND TUBE—SYMPTOMATIC CURE.

BY AMÉDÉE GRANGER, M. D., NEW ORLEANS, LA.

In this paper I will not speak of the etiology and pathology of fibroid uteri, nor of the advantages and modes of action of electrical currents, but limit myself strictly to the use of electrical currents in the treatment of those cases. I have read so many articles, both in the medical press and in medical textbooks, in which the amount of currents used, the duration of the application and other details of treatment were not stated, thus greatly decreasing their value and making it well-nigh impossible to duplicate the treatment; that I will omit no detail of the operative technique and of the results.

I trust that my readers will be indulgent, if at times in my effort to be very explicit, I am too lengthy.

In the latter part of July, 1902, I was called upon to attend a woman suffering from uterine hemorrhages. On examination I found a much enlarged and retroflexed uterus incarcerated in the pelvic cavity and very tender. The right ovary and tube were enlarged, prolapsed and inflamed.

For several months previous the patient had noticed that she menstruated oftener, that the flow was more profuse and accompanied by pain, especially in the right side of the pelvis and in the lower part of the back. For the last two months she had been confined to bed on account of the intensity and constancy of the pain in the right side of the pelvis and lumbar spine.

I succeeded in correcting the malposition by bi-manual manipulation, and the relief of the pain which followed this procedure was very great. The hemorrhage was controlled in a few days by the use of local and general medication.

For two months thereafter the treatment was medicinal and consisted in tonics and the local routine applications to the cervix and vaginal vault, tampons, etc.

Under this treatment, the size and tenderness of the uterus, right ovary, and tube diminished, but the subjective symptoms

were but slightly ameliorated; and there was a recurrence of the flooding with every menstrual epoch, which now took place every sixteen or seventeen days. The patient was growing weaker in spite of the tonics and the anæmia was more pronounced. It was then that I decided to give Apostoli's treatment a trial, and if unsuccessful to refer her to a surgeon.

The first electrical treatment was given September 23, 1902; a large dispersing pad was placed on the abdomen and connected with the negative pole of a galvanic battery and a carbon ball electrode covered with cotton, moistened thoroughly and well soaked, was inserted in the vagina behind the cervix and connected to the positive pole of the battery. The current was gradually turned on and about twenty-five ma. used for five minutes. This application was repeated on the two following days. On the 26th she began to menstruate, the flow was profuse, and accompanied and followed by such severe pains in the right side and back that the patient was confined to bed and could not return to the office for treatment until the 1st of October, when she reported having had fever during the attack.

Examination.—Uterus felt boggy, very tender, cavity measured four and a half inches in depth and there was a profuse yellowish discharge from the cervix. In the right broad ligament there was a large boggy mass, very tender to the touch.

The treatment consisted in correcting the malposition and administering vaginal bipolar faradic sedation from a long fine Goelet coil until all pain in the pelvis was relieved, or about thirty-five minutes.

October 2.—The relief afforded by the treatment of the previous day only lasted about three hours. On examination no change was detected in the condition of the pelvic organs. The malposition of the uterus had recurred and it was corrected before beginning the electrical treatment and before every subsequent treatment.

A tentative intra-uterine treatment was administered with a view of favoring drainage of the contents of the right tube through the uterine cavity. A large dispersing pad was applied to the abdomen and connected with the positive pole of the galvanic battery and an intra-uterine electrode connected with the negative pole was inserted gently into the uterine cavity and the tip directed towards the right uterine fornix in the situation of the opening of the right fallopian tube.

The electrode was held in position, making gentle pressure. The current was very gradually turned on and fifteen ma. administered for eight minutes and as gradually turned off. This was followed by thirty minutes' vaginal bipolar faradic sedation from a fine Goelet coil. The patient was advised to remain in bed the remainder of the day.

October 3.—No pain or marked reaction followed. The patient felt relieved for a while, but the old pains soon returned, although possibly not quite as strong. No change in the local conditions was detected on examination. The treatment was the same as the day before; 20 ma., intra-uterine, negative pole for eight minutes, followed by vaginal bipolar faradic sedation for twenty minutes. During the galvanic portion of the treatment the electrode felt as if the tip had overcome some resistance. The sensation was the same as that imparted to the hand when an olive tip electrode passes through a strictured urethral canal by negative electrolysis. I felt satisfied that the uterine end of the fallopian tube had been dilated, and the report of the patient on the following day confirmed my belief.

October 5.—The patient reported that four hours after leaving the office she passed per vaginam a large quantity of pus intermixed with blood, and immediately felt relieved of the pain and tension in the right side. The night's rest was better than it had been for weeks, and she was in a very hopeful frame of mind this morning. On examination, the mass in the right broad ligament was softer, greatly diminished in size and not as tender; the uterus retroflexed, and the tenderness of the body and fundus was diminished. The treatment consisted in vaginal galvanism, using 30 ma. for five minutes, the vaginal electrode connected with the negative pole, followed by fifteen minutes' vaginal bipolar faradization from a medium Goelet coil.

October 6.—Patient returned to the office and reported having felt very well the remainder of October 4th, and that towards evening the purulent leucorrhea became profuse. The day following she felt slight pains in the region of the right ovary occasionally, and said her womb felt low down. Examination showed the uterus retroflexed; not at all tender to the touch; the right tubo-ovarian mass was much smaller than at the last examination, and free from all tenderness and pain. Vaginal galvanism 25 ma. for five minutes, negative pole, fol-

lowed by vaginal bipolar faradization for twenty minutes, was administered.

October 7.—Felt very well up to the evening of the 6th, when she had quite severe pain in the right side, which felt very sore this morning. The uterus was not tender, but the right broad ligamental mass was more tender than the day before and the distal end of the tube felt slightly larger. After five minutes of vaginal galvanism, 15 ma., negative, the patient complained of slight pain. The current was reduced to zero and 30 minutes vaginal bipolar faradization with a fine long Goelet coil was given. She left the office without any pain or tenderness in the pelvis.

The patient did not return until October 15, when, no tenderness being found on examination, the intra-uterine treatment was resumed, with a view of curing the metrorrhagia.

A copper tip intra-uterine electrode was introduced to the fundus and sectional cupric electrolysis performed. The strength of the current used varied between 25 and 30 ma., and the average time was four minutes. The current was always turned off gradually and the poles reversed, using about 10 ma. negative for a minute or two to loosen the electrode. Some sanguineous discharge followed the application and lasted until the next day; but no pain was complained of. She returned for treatment October 18, although she had begun to menstruate since the night before. Fearing a recurrence of the hemorrhage I repeated the treatment of the 15th. This was not followed by any marked reaction, but increased the flow that day and the following. The menstruation continued for two days longer accompanied only by occasional pain, and for the first time in months was not excessive.

During the two weeks which followed the cessation of the flow, I gave her three more cupric electrolytic treatments, alternating with as many vaginal bipolar faradizations from the medium Goelet coil for sedative-tonic effect.

And I had the pleasure to note her following menstrual epoch come on without pain on the 24th day, the interval being lengthened by six days. It lasted four days and she said that it was the first time in one year that she lost so little and felt so well. I did not see her again until February 3, 1903, at which time she said that she menstruated regularly every twenty-eighth day, the flow lasting three or four days and not at all painful.

Her general condition was much improved and she had gained about fifteen pounds.

I was very anxious for her to continue the treatment, hoping to further improve the retroflexed and prolapsed uterus and obtain as great a reduction in the size of the uterus as possible; but as the symptomatic cure was all the patient had hoped for, she did not return until I sent her word to call at my office.

Her condition on the 4th of April, 1903, when she was last seen by me, was as follows: The symptomatic cure was still all that could be expected with the exception of slight backache and feeling of weight in the lower part of the abdomen after too much exertion. She menstruated regularly and otherwise felt very comfortable.

The uterus was retroflexed, freely movable, not prolapsed as much as before the treatment, and the uterine cavity, which when I first saw her, measured five inches in depth, only measured three inches now. The vaginal walls were firmer. There was no tenderness in the right broad ligament, although the right ovarian tube was still slightly enlarged.

In conclusion I will say that I feel satisfied that if the treatment had been persisted in and a few more intra-uterine applications made with the positive pole of the galvanic battery and a current ranging between 50 and 150 ma. followed by the faradic stimulation from a coarse secondary coil, alternating with vaginal faradization from a coarse secondary coil, that I would have obtained an anatomic as well as a symptomatic cure.

108 Bourbon, cor. Canal.



THE TREATMENT OF CHRONIC DISEASES BY
PHYSICAL THERAPEUTICS, THROUGH THE
SYMPATHETIC NERVOUS SYSTEM.*

BY ALBERT C. GEYSER, M. D.,

Professor of Dermatology in the New York School of Physical Therapeutics.

The sympathetic nervous system consists of, (1) a series of ganglia connected together by intervening cords, extending on each side of the vertebral column from the base of the skull to the coccyx; (2) of three great gangliated plexuses situated in front of the spine in the thoracic, abdominal, and pelvic cavities; (3) of smaller ganglia situated in relation with the abdominal and other viscera; and (4) of numerous nerve fibers, which again are of two kinds, the communicating, by which the ganglia communicate with each other and with the cerebro-spinal nerves, and the distributing, by which the sympathetic system comes into close relationship with all the internal viscera and the coats of the blood-vessel, by which means it is able to reach all parts of the body wherever blood flows.

The ganglia of these cords lie close to and in front of the vertebral column, and correspond closely in number to the vertebrae against which they lie, except in the neck, making in all 3 cervical, 12 dorsal, 4 lumbar, and 5 sacral; the 3 cervical are situated in front of the transverse processes of the vertebrae.

As the two cords pass into the pelvis, they converge and unite in the median line to form a single ganglion, the *ganglion impar*, placed in front of the coccyx.

Each ganglion may be considered as a separate and distinct center possessing *communicating* as well as *distributing* fibers; the communicating branches are in relation with other ganglia and with the spinal nerves, while the distributing fibers supply the neighboring tissues. A close relationship is therefore established between the entire length of this ganglionic cord, the tissues, and the cerebro-spinal system.

The three great gangliated plexuses are situated in front of the spine and, according to their situation, are known as the *cardiac*, the *solar* or *epigastric*, and the *hypogastric* plexuses. They consist of collections of nerves and ganglia, the nerves

* Read at the meeting of the Clinical Society of the New York School of Physical Therapeutics, June 19, 1903.

being derived from the gangliated cord and from the cerebro-spinal system, and distribute branches to all the viscera, thus again observing the same close and intimate relationship between all the internal organs and the cerebro-spinal system.

The third division, or smaller ganglia, are found scattered amidst the nerves and in certain viscera as the heart, the stomach, and the uterus. They also act as centers, possessing communicating branches with receiving and distributing branches to send out impulses.

The fourth division, or branches of distribution, are derived from the gangliated cords, from the great plexuses and the smaller ganglia. These are principally destined for the blood-vessels, the thoracic and abdominal viscera. They supply the involuntary muscular fibers of the coats of the blood-vessels and the hollow viscera and the secreting cells.

In addition to these, the five ganglia connected with the third nerve, ganglion of Gasser, Meckle's, otic, ciliary, and submaxillary, constitute the entire sympathetic nervous system.

The cardiac plexus is situated at the base of the heart and is divisible into a superficial and deep portion. The deep portion is situated in front of the trachea at its bifurcation, and is formed by the cardiac nerves derived from the cervical ganglia of the sympathetic and the cardiac branches of the recurrent laryngeal and pneumogastric.

The epigastric, or solar plexus, supplies all the viscera in the abdominal cavity. It consists of a great network of nerves and ganglia situated behind the stomach and surrounds the celiac axis, extending down as low as the pancreas and outward to the suprarenal capsules.

From the solar plexus we have the following subdivision: Phrenic or diaphragmatic, suprarenal, renal, spermatic, celiac, superior mesenteric, and aortic plexuses.

The *suprarenal* deserves especial mention. It is formed by branches from the solar plexus, the semi-lunar ganglion, the phrenic, and the great splanchnic nerves. It supplies the suprarenal capsule. The branches of this plexus are remarkable for their large size in comparison to the size of the organ it supplies. This is of more than cursory significance, inasmuch as it partly accounts for the importance of this organ in the organism.

The hypogastric plexus supplies the viscera of the pelvic cavity. It is situated in front of the promontory of the sacrum, between the two common iliac arteries, and is formed by the union of numerous filaments which descend on each side from the aortic plexus and the lumbar ganglia.

The hypogastric plexus is divided into two lateral portions which form the pelvic plexuses, which in turn form subdivisions forming and supplying the inferior hemorrhoidal, the vesical, the prostatic, the vaginal, and the uterine plexuses.

From the foregoing anatomical review it must be apparent that the sympathetic nervous system is in very *close* relationship not only with all the organs of the body, but by surrounding the blood-vessels, even down to the capillaries, reaches the most superficial as well as the deepest; the nearest as well as the most distant structures of the whole body. Since the presence, and its *peculiar anatomical relationship* with the *cerebro-spinal nervous system and all the organs and tissues of the body is undisputed*, it naturally leads to but one logical conclusion, which is *that the sympathetic nervous system has a function to perform which it need hardly be said is a most important one*. We will next consider something of the physiological action of this most important nervous system.

If we view the sympathetic nervous system as a whole, we find that it differs but slightly from the central nervous system. Beginning above by the ophthalmic ganglia and ending below by the *ganglion impar*, we have this double chain of ganglia and nerve fibers connected with each other and with the cerebro-spinal system. Every ganglion sends to and receives from the central nervous system, fibers. Each ganglion is capable of acting as a separate nerve center for the particular area to which its own as well as the motor and sensory fibers are distributed. As we know from abundant experiments, the specific action of a motor or sensory nerve when irritated, so we have formed conclusions regarding the effects of irritation upon a sympathetic nerve. The *result* of such irritation is manifested by a change in the local nutrition, calorification, and secretion.

When the sympathetic nerve is divided in the neck, we have following immediately a local increase in temperature with a very marked increase in the supply of blood on that side of the head corresponding to the side of section. The increased tem-

perature is no doubt due to the local exaggeration of the nutritive processes.

Apparently dependent directly upon the hyperæmia, there is also a marked injection in the conjunctiva with dilatation of the pupil upon the corresponding side. Should a section of the nerve be so made, or a permanent compression be applied, so that these phenomena may continue for two or more weeks, a notable increase in the size of the ear and other tissues affected will be observed.

When the distal end of the sympathetic in the neck, however, is irritated with the constant or galvanic current, an entirely new set of manifestations occur. Where there was previously hyperæmia with increased temperature and dilatation of the pupil, local anæmia is induced, with decrease in temperature and contraction of the pupil. Should the section or ligature be low enough down to include fibers of the coeliac plexus, we have a slowing of the heart's beat, as well as a weakening of the heart's impulse. Again, if the distal end be irritated with a weak galvanic current, we observe at once an increase in force and frequency. As regards secretion, the influence of the sympathetic is very marked. When the sympathetic filaments distributed to a gland are divided, the supply of blood is very much increased and an abundant flow of secretion follows; whereas if irritated with a galvanic current, there will be glandular anæmia with contraction of size and absolute stoppage of its secretion. Neither is it at all necessary in order to produce these various phenomena to resort to section; the mere application of heat or cold, the faradic or galvanic currents, light or heavy pressure, certain visual, auditory, or olfactory impressions all serve, more or less, to bring into action or interfere to a greater or lesser extent with the function of the sympathetic nervous system. All the various phenomena observed by irritation of the cervical sympathetic may be reproduced on all other organs and tissues of the body, if the location for the specific center of the same is known.

From its close and intimate connection with the cerebro-spinal and the arterial system, it has very appropriately been named the sympathetic system. There is not a single act, manifestation, or phenomenon surrounding an individual, either appreciated by his special senses, the motor or sensory nerves, which sooner or later will not enlist the sympathy of the par-

ticular system under present scrutiny. If any other name were to be suggested, it would seem that the name *vegetative* nervous system might properly be substituted for it, for the growth and the repair of all tissue is under the direct supervision of the sympathetic nervous system. Knowing and believing this to be the fact, it seems reasonable that this system or part of our economy is deserving of the highest of our consideration in the therapeutic application of our various remedial measures.

The Reflexes:—Realizing and appreciating the important anatomical and physiological arrangements of the sympathetic nervous system, it behooves us to consider at least one extremely interesting as well as more or less obscure function of this and the cerebro-spinal system—namely, the *reflexes*.

All acts must be either reflex or automatic, voluntary or involuntary, or a combination of both, one more or less predominating over the other.

Automatism is a power possessed by certain nervous centers in the cerebro-spinal axis, that is, the power to initiate outgoing impulses independently of any incoming impulses.

Respiration and cardiac action may be mentioned as being truly automatic. Constancy of this automatic action is assured by inhibition and augmentation. Both are subdivisions of the automatism of nervous centers.

Inhibition is, therefore, that automatic function of a nervous center, by virtue of which it holds in check some function of the body.

As an example of inhibition, we may mention the function of the cardiac inhibitory center in the medulla which, by means of the vagi, checks the rapidity of the heart's action. This function of inhibition can be augmented reflexly, as, for instance, when the abdominal sympathetics are irritated with sufficient force the heart may actually be made to cease beating.

Augmentation is, of course, the opposite function by virtue of which they accelerate or augment some particular vital function. The respiratory center in the medulla is constantly receiving impulses tending to accelerate its function, thus causing increased respirations whenever the requirements of the economy demand it; which demand is usually made reflexly.

By reflex function is understood the power of such centers to send out efferent impulses in immediate response to afferent stimuli. As the ingoing impulse may affect some motor, secretory, or other function, the result of reflexes may be infinitely varied. Three neurons are essential for the completion of a

reflex act: an afferent, or ingoing neuron, to convey the impression; a recipient neuron at the nervous center; and, thirdly, an efferent, or outgoing neuron, connected with some organ that may manifest the reflex impulse. Although generally speaking it is true that the greater the ingoing impulse, the greater the reflex, yet we often find a great disproportion between the two, in that a very limited stimulus will oftentimes cause a most violent explosion of the reflexes. This can only be explained by bearing in mind that each ingoing neuron—entering the spinal cord by its proximal process—divides into an ascending and a descending branch which, in turn, give off lateral filaments at different levels of the cord called *collateral fibers*.

If irritation or ingoing impulses be prolonged, we will first have reflexes on the corresponding side irritated; then on the opposite side of the body; and finally the whole body may be thrown into reflex spasms. This is explained by the presence in the gray matter of the spinal cord of three kinds of recipient cells: (1) the *tautomeræ*, which send their ascending and descending processes (with collaterals) on their own side of the spinal cord; (2) the *hetromeres*, which cross over to the opposite side of the cord, and there send off ascending and descending fibers and collaterals; (3) the *hecateromeres*, which ascend and descend, with collaterals, on their own and on the opposite side of the spinal cord.

We have now briefly viewed the sympathetic nervous system, its anatomy, physiology, and its close and intimate relationship with the cerebro-spinal and the entire vascular system and the reflexes, which could not manifest themselves except by harmonious arrangement. All of these systems act as a unit.

It will now be interesting to again view this compound and complex system as a whole, and instead of the normal manifestations, pay our homage to abnormal or pathological conditions spoken of as disease.

Disease is a condition of the body marked by inharmonious action of one or more of the various organs, owing to abnormal conditions or structural changes. We can roughly divide all causes of disease into four general classes, namely: diseases produced by (1) microbic invasion, (2) chemical, (3) mechanical, and (4) psychical agents. One of these four or frequently the combined action of some or all of them, is sure to be the foundation of all of our ills.

The particular manifestation produced upon the economy or part of the body depends, of course, upon, first, the *cause*; second, the particular organ or tissue affected; and, third, and most important of all, the reflex effect upon the body in general. This, then, would explain the difference between acute, sub-acute, and chronic, as well as between local and constitutional, diseases.

Editorial.

EFFECTS OF HUMIDITY UPON THE STATIC MACHINE.

IT is appreciated by all who employ the static machine that during periods of humidity the machine either generates no current or the current which is generated is available to a degree relative to the humidity. This applies to all sorts of static machines, and especially to those which are most used, on account of the constant discharges of ozone, nitrous acid, and H₂O within the case. The problem to solve has been how to promote the absorption of the deleterious products of the electrical discharges, and, at the same time, get rid of the moisture which is certain to creep into the case during periods when the air is saturated with moisture.

No agent so well meets these requirements as the commercial *quicklime*. It should be placed in a wooden box having lath sides placed $\frac{1}{4}$ -inch apart, and covered on all sides with two thicknesses of good muslin. From twenty to forty pounds of fresh hard lime should be put in this box at least once monthly during the summer. This will absorb much of the noxious gases, as well as the water, and machines which were in fair condition when the lime was put in the case will rarely discharge when used daily. Chloride of calcium, which is in such common use, is positively deleterious in the long run to the interior of the machine. The only condition to be obviated in the use of lime is the dust which will settle upon all parts of the machine if not tightly closed in with muslin, as suggested.

* * *

THE PUBLIC NOTION OF THE DANGERS OF THE X-RAY.

RECENT widespread publications of Mr. Edison's experiences with the X-ray and similar contributions are calculated to bring the public mind into a state of uncertainty concerning the dangers of this valuable therapeutic modality. We

can not believe that this will affect its employment in the hands of recognized authorities. It will act as a timely warning however, against the employment of the X-ray by charlatans and those of limited experience in its use, and thereby induce a more favorable impression by preventing the accidents which must occur in the hands of those who do not understand it and by leading those who are not familiar with its actions to investigate more thoroughly before they undertake its employment. With these two classes of operators, there is a danger which the public should appreciate. In the hands, however, of the skilled physician who both knows how to take care of himself and patient there need be no concern as to unfavorable results from the use of the Roentgen ray.

* * *

DR. NEWMAN'S ANSWER.

WE take pleasure in publishing as one of the original articles in this issue an answer from Dr. Robert Newman to a criticism of his method in the treatment of strictures by electrolysis by a writer in a recent number of an exchange.

It is a late day for any intelligent physician to assail Dr. Newman's method, and we congratulate the doctor upon the able manner in which he has met the criticism. Those who are familiar, as the writer is, with Dr. Newman's method and uniform success deplore the fact that an exchange devoted to electro-therapeutics should publish a paper showing such profound ignorance of the technique and lack of skill in its performance, thereby condemning the most proper method of treating this unfortunate condition.

* * *

ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

AS announced in the previous issue of the JOURNAL, the annual meeting of the American Electro-Therapeutic Association will be held at Atlantic City, N. J., on September 22, 23, and 24, 1903.

Arrangements have been made for round trip tickets from New York to Atlantic City for the members and their friends at \$4.75.

This meeting promises to be one of the most successful and interesting in the history of the Association. The programme, including a large number of very interesting papers by men whose names are a guarantee of their excellence, is published in another part of this issue.

The Editor will be pleased to receive applications for membership from those who wish to enroll themselves as members of the Association, the fee for which is \$10, which includes the first year's annual dues. All members who can present credentials showing themselves eligible to the American Medical Association will be admitted subject to an election by the members of the Association.

* * *

A SERIES OF PAPERS UPON THE "THERAPEUTICS OF THE CONTINUOUS CURRENT."

WE are pleased to announce that with this issue of the JOURNAL we begin a series of papers by Dr. Margaret A. Cleaves upon the "Therapeutics of the Continuous Current." The name of this well-known writer is a guarantee of the value of this series of papers, which will be published monthly until completed.

* * *

A CHANGE IN THE EDITORIAL DEPARTMENT OF VIBRATION-THERAPY.

IT is with regret that we announce the retirement from the editorship of the department of Mechanical Vibration-Therapy of Dr. Lucy Hall-Brown. While retiring from the active direction of this department, Dr. Hall-Brown still retains her deep interest in the new therapy and in the JOURNAL.

Fully appreciating the valuable services of the retiring editor, it is with great pleasure, if a change must take place, that we announce as successor to the retiring editor Dr. Frederick H. Morse, of Melrose, Mass. As is well known, Dr. Morse was president of the American Electro-Therapeutic Association one year ago, and is deeply interested in all progressive therapeutic methods. While his close identification with electro-therapeutics affords ample guarantee that his direction of the comparatively new department of Mechanical Vibration-Therapy will be along broad lines and free from prejudice.

ANNOUNCEMENT.**AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.**

Preliminary Programme. (Subject to Change.)

The thirteenth annual convention will be held at the Hotel Windsor, Atlantic City, N. J., on September 22, 23, and 24, 1903. The rate will be \$3.50 per day for each person. These terms apply to members of the families of members of the association and their friends, who are brought to the hotel by reason of the convention.

The regular hotel stage carries passengers from the railroad station to the hotel at 25c. per person. There are also plenty of hacks and conveyances of all sorts available for this purpose. For all single horse 'buses the fare from the railroad station to the Hotel Windsor is restricted by law to 10c. per person, with a charge of 25c. per piece for baggage.

Rooms may be reserved by writing to the proprietor, Mr. G. Jason Waters, Hotel Windsor, Atlantic City, N. J., and will be held in the order in which the written reservations are received. It would be well, therefore, for those intending to come, to secure their rooms well in advance of the meeting.

Cars for the exclusive use of those attending the convention will be attached to the train leaving the Twenty-third Street station of the Pennsylvania Railroad at 9.55 a. m., Monday, September 21. The price of the round-trip ticket, good for return any time within fifteen days, is \$4.75. Any further information can be secured by addressing the secretary, Dr. C. E. Skinner, New Haven, Conn.

The attractions of Atlantic City are so well known that any description is entirely unnecessary. Those who desire to combine pleasure with the regular business of the association will find no difficulty in employing their time satisfactorily, as the excursion ticket permits a stay of fifteen days. Ample time, therefore, will be given those who desire to avail themselves of the opportunity of becoming familiar with Atlantic City and its environs. The Atlantic City Hospital, Mercer Home, and Children's Seashore Home will be open to members at all times. The lighthouse can be visited any day in the morning.

The attractiveness of the scientific programme, which follows, speaks for itself:

FIRST DAY, TUESDAY, SEPTEMBER 22, 1903.

Morning Session.

Registration of Members.

9 o'Clock.—*Executive Session*; 10 o'Clock.—*Scientific Session.*

Reading of minutes of previous meeting; Addresses of welcome and responses; Reception of Honorary Fellows and Guests; Communications; Address of President; Report of Committee on Arrangements; Resolutions.

REPORTS OF STANDING COMMITTEES.

On Induction Coils and Alternators, by Margaret Abigail Cleaves, Chairman.

On Electric Light Apparatus for Diagnosis and Therapy, and the Roentgen Ray, by William Scheppegegrell, Chairman.

On Electrodes, by R. G. Brown, Chairman.

On Meters, by Robert Reyburn, Chairman.

On Cataphoresis, by Fred Harris Morse, Chairman.

On Static Machines and Condensers, by William Benham Snow, Chairman.

On Constant Current Generators and Controllers, by William James Herdman, Chairman.

On Current Classification and Nomenclature, by William Johnson Jenks, Chairman.

On St. Louis Exposition in 1904, by William Benham Snow, Chairman.

Papers.

"Electrotherapy as a Specialty," Alfred William Bayliss, Buffalo, N. Y.

"Currents of High Frequency, Apparatus, and Therapeutic Uses," Francis Goodwin DuBose, Selma, Ala.

"The Effects of the Secondary Static Currents in Removing Albumin and Casts from the Urine," Boardman Reed, Philadelphia, Pa.

"Some Principles Upon Which is Based the Use of Electricity in Nervous Diseases," Alfonso David Rockwell, New York, N. Y.

"Electricity in the Treatment of Diseases of the Stomach," Harvey Hamilton Roberts, Lexington, Ky.

AFTERNOON SESSION, FIRST DAY, 2 O'CLOCK.

Exhibition drill of the crew at the Life Saving Station.

3 o'Clock.—*Scientific Session.*

"Retrospect of the Second International Congress on Electro-Therapeutics at Bern," Robert Newman, New York, N. Y.

"Electricity in the Treatment of Chronic Deafness," George Zena Goodell, Salem, Mass.

"Employment of Static Electricity in the Treatment of Nervous Diseases," William Benham Snow, New York, N. Y.

"Electrical Treatment of Trachoma and Corneal Opacity, with Illustrative Case," Margaret Abigail Cleaves, New York, N. Y.

"The Successful Treatment of Eighteen Cases of Granular Lids by the X-ray and High Frequency Vacuum Electrodes," Albert Charles Geyser, New York, N. Y.

"The Treatment of Urethral Stricture, and Fissure of the Anus by Electrolysis, with Report of Cases," John Clark Luke, Ocilla, Ga.

"Exophthalmic Goiter and Its Rational Treatment, with Exhibition of the Broom Electrode," Francis Besant Bishop, Washington, D. C.

"A Year's Work in Electro-Therapy," Laura Viola Gustin-Mackie, Attleboro, Mass.

SECOND DAY, WEDNESDAY, SEPTEMBER 23, 1903.

9 o'Clock.—*Executive Session*; 10 o'Clock.—*Scientific Session.*

Problems in Electro-Therapeutic Practice: a General Discussion. Members are invited to submit difficulties, arising in practice, on which information or advice is desired, and to offer suggestions as to the solution of such problems.

Ten o'Clock.—Visit to United States Signal Station. Reading of papers will not be suspended during this event.

Papers.

"A Plea for Electro-Therapeutics Proper," William James Herdman, Ann Arbor, Mich.

"Radiant Light Baths in the Treatment of Neuroses," Thomas Davidson Crothers, Hartford, Conn.

"Treatment of Tuberculosis, with Report of Cases," Russell Herbert Boggs, Pittsburg, Pa.

"The X-rays in the Treatment of Tuberculosis of the Throat," William Scheppegegrell, New Orleans, La.

"Some New Points in the Treatment of Tuberculosis," Wolff Freudenthal, New York.

"The Roentgen Ray in the Treatment and Cure of Cancer, Lupus, Rodent Ulcer, and Eczema, with Histories of Cases Treated," Elijah Wilkinson Smith, Terre Haute, Ind.

"The Use of the X-ray in the Treatment of Malignant Growths, with relation of Cases," Marcus Morton Johnson, Hartford, Conn.

AFTERNOON SESSION, SECOND DAY, THREE O'CLOCK.

Scientific Session.

"Artificial Fluorescence of Living Tissue, Produced by Fluorescent Liquids Administered Internally, and the X-ray," William James Morton, New York, N. Y.

"The Position of the Roentgen Ray and Ultra-Violet Light in the Therapeutics of Malignant Diseases of the Uterus and Adnexa," Margaret Abigail Cleaves, New York, N. Y.

"The Type of Cell and Pathological Features of Carcinoma which Do Not Respond to X-ray Therapy," William Leroy Kenney, St. Joseph, Mo.

"The Present Status of X-ray Therapy in the Management of Cancer," Clarence Edward Skinner, New Haven, Conn.

"A Plea for an Accurate and Scientific Method of Roentgen Ray Treatment," Mihran Krikor Kassabian, Philadelphia, Pa.

"The Use of Galvanic Electricity in the Treatment of Cancer and Kindred Diseases," William Winslow Eaton, Danvers, Mass.

"A Case of Asthma with Fibroids and Pelvic Adhesions, Cured by Galvanism," Charles Augustine Covell, Syracuse, N. Y.

Executive Session.—Election of Officers.

9 o'clock p. m.—Reception given by the medical profession of Atlantic County, N. J., and the Academy of Medicine of Atlantic City, N. J., to the members of the Association and guests at the Marine Room, Hotel Windsor.

THIRD DAY, THURSDAY, SEPTEMBER 24, 1903, 9.30 O'CLOCK.

Scientific Session.

"Cataphoresis," James Cornelius Gill, Chicago, Ill.

"The Roentgen Ray as an Aid in Diagnosis," Herman Grad, New York, N. Y.

"Perineuritis," Almerin Webster Baer, Chicago, Ill.

"Nerve Health and Nerve Debility: the Effect of the Actinic Rays upon Tissues," Albert Eugene Sterne, Indianapolis, Ind.

"Electro-Therapeutic Gleanings," Jefferson Demetrius Gibson, Birmingham, Ala.

Members of the medical profession are cordially invited to be present.

Progress in Physical Therapeutics.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

"Curare Cito, Tute, et Jucunde."

Medicine seems to have caught the modern contagion of rush and hurry and in the anxiety to reach some short and royal road to the cure of disease, the two principal divisions of our caption and quotation are forgotten and to cure quickly seems to be the one idea. Safely and pleasantly are often not considered.

While we are at times called upon to applaud some brilliant result where great chances have been taken with the life and comfort of the patient in apparently hopeless cases, one should not take such cases as a general guide. Powerful drugs and anodynes are often recklessly administered for the relief of acute painful conditions that are frequently more amenable to the judicious use of electricity or other agent equally harmless.

When we pass the realm of medicine and enter that of surgery we are glad to find a degree of conservatism among the prominent and skilled diagnosticians, but many a poor woman has been hopelessly maimed, unsexed, and made permanently nervous, if not insane, in a futile effort to relieve or remove by operation a supposed cyst, pus-tube, or degenerate ovary; when often the trouble might have been found in the spine and nerves radiating therefrom, supplying the painful areas. Here electricity will do noble work in strengthening the weak spinal muscles and stimulating to healthy energy the plexus of nerves supplying the pelvic viscera and thereby, through its action on the sympathetic, blood and nerve supply are equalized.

Give as much time to the study of electricity as is given to the knife and poisons in the treatment of chronic disease, then dangerous dosing and heroic and capital operations will be relegated to their proper place. With desperate cases desperate means are justified.

But electricity, it must be understood, can be handled successfully only after careful study and training in the use of the various apparatus. The mere fact and simple statement that

one has used the "galvanic current" in a given case, offers no information to the skilled electro-theraputists, but does publish the lack of information in the person using the current.

When a special form or kind of electricity is carefully selected to suit a special form or kind of chronic or acute nervous disease and then administered with skill and judgment, we may safely claim that it will cure more quickly, more safely, and more pleasantly than any remedy subject to therapeutic application.

The Action on Bacteria of Electrical Currents of High Potential and Rapid Frequency.

An abstract, from the British Medical Journal of April 25, 1903, appears in a recent number of Progress of Medical Science, a paper read before the London Pathological Society by A. Foulerton and D. Kellas, on the "Action on Bacteria of Electrical Currents of High Potential and Rapid Frequency." In this paper are many points of interest, but either in the original or in abstracting from the original article much of the scientific value is lost in describing the current used.

In the present state of general knowledge concerning the various currents, one cannot be too particular in describing minutely the apparatus used and not leave too much to the imagination; as there are many physicians who read these articles for the benefit they expect to derive from them and can only be led astray when they read about high frequency currents and find that "the current used was one of from 2.5 to 5 amperes, the voltage varied from 35 down to 24, and the bacteria were destroyed after an exposure to the current of 10 to 45."

The duration of time before sterilization of the bacterial emulsion apparently varied with the intensity of the current employed. We naturally conclude that the current mentioned was simply the direct current as measured through the ameter and volt-meter, before or perhaps after passing through the primary. This in itself furnishes very little information unless the coil and style of transformer, alternater, and interruptives were described. The current as mentioned in the paper is a current of low potential and must pass through a transformer before it can be called a current of high potential and rapid frequency, and judging from the further tone of the article such

an apparatus *was* used, and the bacteria tested were " *B. typhosis*, *B. colicommunis*, *B. prodigiosus*."

They found that if the experiments were carried out in an atmosphere of hydrogen, the bacteria will, in some cases, survive exposures. When the discharge is sprayed over water, in an atmosphere of common air, nitrous and nitric acids formed from the peroxide of nitrogen, due to the discharge of the current in the air. The nitrous acid rapidly changed to nitric acid, and it appeared that the germicidal action was chiefly due to the latter substance, and it seemed that the solution of the nitrogen peroxide by the fluid was assisted by the electric discharge on the surface, the gas being carried down to the fluid, as it were, by the discharge.

These gentlemen claim to have proven that bacteria suspended in water could be destroyed by the discharge of currents of high frequency and high potential in an atmosphere of common air and close to the surface of the fluid. The bacterial emulsions were contained in ordinary glass tubes, through the bottom of which a length of platinum wire was sealed.

They further speculate that "it is not unlikely that with the discharge of such currents over the skin a somewhat similar penetration of the chemical products might occur." In any case, it seems as if the discharged current has very little direct action on bacteria with exposures of moderate duration. "The useful effect of the discharge of currents in certain conditions when ulceration is present, must be taken as being due, at any rate in part, to the germicidal action of chemical decomposition products formed in the air."

These experiments prove that the bacteria under consideration may be destroyed outside of the body by the high frequency, high potential current, and as the conditions inside the body are more favorable to their destruction by the current than those outside, there is reason to believe, not only from the experiments outlined above, but from numerous clinical observations, that this current does destroy bacteria.

Beside the bactericidal effect of nitric acid as produced from nitrous acid and nitrous oxide, we have the elimination from the surrounding atmosphere of an abundance of ozone, and as the nitric acid penetrating the tissues with the current attacks the germ, the ozone also passes into the tissues and brings new life and vigor to the blood corpuscles; nerve centers are invigorated and resistance is established.

Furthermore, in the high frequency current, notwithstanding the fact that often only one side of the coil is used, we cannot eliminate the opposite pole of the battery, and while one pole is sending this high frequency, high potential current into the body, at a diseased area, the body itself in contact with the earth becomes the other pole of the battery, and is subject to all the variations of potential and frequency as the battery and coil producing the current, carrying to every current the life-giving oxygen and localizing at the point of disease the destructive agency in the form of nitric acid. As this is necessarily an alternating current, the action is as free in one direction as it is in the other, producing a series of small and very rapid metabolic changes in the tissues which render them capable in many cases of throwing off diseased conditions.

F. B. B.

DISEASES OF THE ALIMENTARY CANAL.

EDITED BY WALTER H. WHITE, M. D.

Radiotherapy in Enteritis and Colitis. By Sinclair Tousey, A. M., M. D., New York and Philadelphia Medical Journal.

The writer began "this line of treatment in cases in which there was a chronic condition of pain, or discomfort with frequent discharges of mucus, and occasional discharges of blood or of false membrane, and which had failed to yield to the use of intestinal antiseptics, such as naphthalin given by the mouth, and to the use of other antiseptics given by enteroclysis.

"The mucus from these cases is often stringy and looks like some new and strange kind of worm, and on microscopical examination is found to consist of mucin, many desquamated epithelial cells, and many of the *Bacilli coli communes*. In the two or three cases in which expert examination has been made for me, tubercle bacilli were found to be absent. . . .

"The absence of any undesirable effect in about three hundred applications of the X-ray for therapeutic purposes and in fluoroscopic and skiagraphic examinations, has been attributable to attention to the different considerations in each case. . . .

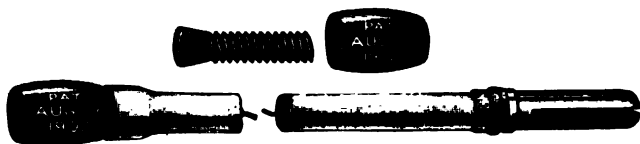
We must consider the character of the parts exposed to light, and especially the degree of vacuum in the tube—the greater the rarefaction the greater is the penetrating power and the greater is the effect on deep structures. The duration and frequency of the application must be most carefully considered. The parts which it is not desired to influence should always be protected by sheet-lead or something similarly opaque to the X-ray.

"In addition to exposure to the X-ray proper, another application has been made by means of a glass vacuum tube connected by a thoroughly insulated wire with one pole of the great Ruhmkorff coil which forms part of the X-ray outfit. When the current is turned on, such a tube becomes filled with waves of light passing from the rheophore toward the bulbous extremity, which is in contact with the skin, and the patient receives, with hardly any sensation, a wave like the discharge of very high voltage and considerable amperage. The connection is with only one pole of the coil and the tube is provided with an insulated handle for the use of the operator. If separated from the surface, a shower of sparks passes from the vacuum-tube to the skin. This does not appear to produce as good results as the direct contact and is more or less disagreeable, depending upon the sensitiveness of the surface. . . .

"The few cases already under treatment show the improvement which may naturally be expected from a novelty. My expectation of lasting benefit is not so much on account of the well-known germicidal action of the X-ray, as on account of the stimulative and alterative effect of the combined applications of the X-ray and the high tension discharge from the vacuum tube."

An Aseptic Stomach Electrode.

My attention was recently called to a new stomach electrode devised by Dr. G. G. Marshall, Wallingford, Vt., which seems to have some points of advantage over those now in use—principally from the ease with which it can be taken apart and thoroughly cleansed. The small size of the bulb avoids the sense of choking, and is easily manipulated. The hard rubber covering is



Dr. Marshall's Stomach Electrode.

a flattened ovoid in shape; projecting over the metallic end sufficiently to protect the stomach from contact with the metal. The tubing is sufficiently firm to assist in the easy introduction of the electrode into the stomach. The electrode, having been introduced into the stomach, is usually connected with the negative cord of the battery. The positive being attached to a sponge or small pad electrode, this is then applied over the stomach and bowels, and for a moment over the seventh dorsal vertebra, when it is again moved in front of the stomach and the current strength reduced to zero and then withdrawn. The faradic current should be strong enough to cause distinct muscular con-

tractions. If the galvanic or continuous current is used, about 15 milliamperes would be the average dose, the length of time in either case being from eight to fifteen minutes. The treatment is given every day until improved, when twice a week will be sufficient.

The patient should drink a glass of water before introducing the electrode. More detail of the technique will be found in Einhorn's text-book on diseases of the stomach.

W. H. W.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

The Use of X-Rays in Ophthalmic Surgery. By M. S. Mayou, F. R. C. S. (Lancet, Feb. 28, N. Y. Med. Jour.)

In this paper the author discusses the use of X-rays in ophthalmic surgery in connection with (1) the localization and treatment of metallic foreign bodies in the globe; (2) rodent ulcer of the eyelids; and (3) the treatment of trachomagranular ophthalmia. (1) It is of the greatest importance immediately to localize and remove foreign bodies in the globe of the eye, as they are the most frequent source of sympathetic ophthalmia, they usually give rise to suppuration, and if left for a day or two they become rapidly encapsulated and often defy extraction with the electromagnet. Skiagraphy is invaluable in these cases. The salient points in connection with localization are: (a) immediate localization, to be repeated if the foreign body is not found; (b) the use of separate plates; (c) care to be taken not to let the cross wires fall within the shadow of the orbit; (d) localization and estimation of size; and (e) the use of the stereoscope for the estimation of shape. In operating for these foreign bodies the best method is to use a small electromagnet. (2) The eyelids, especially the lower, are a common site for rodent ulcer, and, as elsewhere, application of the X-rays can bring about a cure. The author holds that they act by producing leucocytosis; the leucocytes remove all irritating cells or substances, or encapsule them and prevent their spread. A 5 per cent. solution of carbolic acid is used to dress the ulcers; it keeps them aseptic and accelerates primary reaction. (3) At the present time trachoma is treated by applying some form of irritant, either chemical or mechanical, to the eyelid, producing a leucocytosis. In the X-rays we have a method of setting up a leucocytosis with the absolute minimum of destruction to epithelial and other tissues. In this way excessive scar formation is avoided. Further, the effect produced from a slight leucocytosis to actual gangrene, is under almost perfect control. There is much less deformity in the lid after treatment, the

procedure is practically painless, and pannus clears up quickly and thoroughly.

The Electro-magnet Applied for the Extraction of Foreign Bodies in the Air Passages.

In view of the success attending the use of the electric magnet in the extraction of steel and iron particles from the eye, attempts have been made to use it in the department of Laryngology. G. Prota, Naples (Laryngoscope, April, 1903), refers to the fortunate cases of Garel and Piechaud, who each extracted a nail from the bronchus, and he also reports another case of Massei. One case published and the other unpublished is detailed by the author. It concerns a boy of eight who, playfully, placed a number of nails (horseshoe nails) in his mouth and inspired one in his larynx. He had an attack of suffocation, which ceased in a short time, were repeated at intervals, and ceased after forty days without any treatment.

Laryngoscopic and X-ray examination showed the nail situated with its head on the level of the right bronchus and the point as high as the trachea. Tracheotomy was performed and the electro-magnet brought to the wound without any result. Forceps were also unavailing, as the nail was wedged in the right bronchus, and the child died from suffocation.

Necropsy revealed an emphysema of the neck and thorax, of the anterior mediastinum and of the upper lobe of the right lung, atelectasis of the middle lobe, a marked hyperemia of the inferior lobe and a hyperemia of the entire left lung.

The Significance of Snoring.

Generally speaking, there are two forms of snoring, one with the mouth open and the other with it closed. The former is much more injurious, owing to the fact that the air, being inspired through the mouth, does not receive the benefit of the nasal function in respiration, that is, the warming, moistening, and cleansing of the air that is inhaled into the lungs.

In the case of snoring with the open mouth, where there is absolutely no nasal obstruction, Dr. Jules Veis, of Frankfort a. M. (Archiv f. Laryngologie. Bd. xiii, Heft 3; Laryngoscope April, 1903) states that the habit may be overcome by the use of a very simple device. In these cases a chronic post-nasal irritation is set up, which annoys the sufferer, not only during the night, but all day as well. Various neighboring regions finally become involved in the chronic inflammation that ensues, so that at the last these patients present a well-defined case of pharyngeal catarrh without any corresponding irritation in the nose.

The device to which reference has been made consists of two flannel bandages about four centimeters wide, the middle of one of which is laid across under the chin and the ends are carried up and tied at the vertex. The other is then laid across the

occiput, the ends carried forward and tied over the forehead. At the point where these bandages cross each other on each side of the head they are pinned together to prevent slipping. Very slight pressure need be used in tying the bandage which holds up the chin, as the latter falls only by reason of relaxed muscles and very little force is needed to hold it in position. Dr. Veis says that in those cases treated by him it was necessary to wear the bandage only from eight to fourteen nights, when the habit was overcome. Of course, if the nose becomes obstructed by a rhinitis it may be necessary to wear the bandage a few nights whenever that occurs. In many instances the previous angry and inflamed pharyngeal mucosa lost its irritated appearance, and what appeared to be an incurable case of post-nasal catarrh was at once resolved into a simple irritation that yielded readily to treatment.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

Clinical Results with Roentgen Rays. By Albert Soiland.

Reports five very interesting cases of epitheliona. One on right cheek; one one inch from the external canthus of right eye; one of penis; one of the nose; one of the mammary gland—all were successfully treated by the X-ray and all apparently cured with a remarkably small number of exposures. One or two seem to have been cured with a minimum number of exposures, in fact, thirteen exposures to the mammary cases being the most that was given to any one case except the penis, which has always been a difficult condition to cure. In fact, the cases required much less treatment than is necessary to remove superfluous hairs, or to cure cases of acne vulgaris conditions, which are ordinarily considered much easier to manage and require much less treatment than epithelioma.

He reports a very interesting case of rodent ulcer in a lady fifty-six years of age, in which he got a splendid result, and in which he gave fifty-five radiations and four applications of high frequency currents. He also reports a case of very bad burn which occurred in the office of a local quack. The burn was said to be as large as a dinner plate, causing intense suffering. The doctor is to be congratulated on his work.

Effects of X-Ray. By E. T. Neley, M. D., of Bangor, July, 1903.

He discussed at some length the different theories as to the effect of the X-ray in a very intelligent and masterly way. The doctor seemingly takes the ground that the minimum treatment for the destruction of the disease should be employed, and that the effect of the X-ray is absolutely destructive instead of recon-

structive. He claims that when a cancer is killed or destroyed, which is apparently usually the case when the tissues are well and healthily browned, that the X-ray should cease to be used altogether, as there is danger of destroying the healthy tissue and giving the cancer a new hold upon the patient. This is a point well taken, and I think well worthy of investigation. As the doctor points out, nearly all cases promise well in the beginning, and those which do badly at some point or stage of their treatment have taken a turn for the worse, and there may be something in the doctor's theory of very vital interest to the X-ray worker. The doctor places great stress upon the character of the X-rays, and points out the fact "It is voltage that determines the rate of vibration and not amperage," but the amperage of the light has a great deal to do with determining the effects upon the tissue. He thinks, or, rather, he says, that he has been able with high vacuum tubes having a spark gap resistance of from four to seven inches, to get changes in cancers in one or two weeks and cures eczema with one exposure, and that he has cured an epithelioma one and one-half inches in diameter with three exposures, and thinks in these cases that one or two treatments would have done the work just as well. He thinks when large masses are to be removed it is best to first use the X-ray or the brush discharge to get the absorbents into a healthy condition with the electric current as much as possible; or for the malignant growth to be removed with cautery or knife. He thinks that to be enabled to destroy abnormal growth it is necessary to use machines of higher amperage, as the extra-large static machines and the coarser coils as the Kinraid. These heavy machines produce a current of such magnitude that it excites the tube to a voluminous discharge, more quickly affecting the growth, and correspondingly we are more liable to produce burns with a soft tube on a heavy machine than on a low amperage machine. The more powerful machine the quicker the result, but it requires more skill. He thinks the low tube is not worth much for therapeutic purposes unless the anode plate becomes reddened well during the application.

Some Therapeutic Uses of the X-Ray. By W. T. Spring, M. D., Minneapolis, Northwestern Lancet, July 1, 1903.

The doctor reports twelve cases of epithelioma about the face, nine of which have been cured. Also six cases of lupus vulgaris, three of which are practically cured; two cases of lupus erythematosus have done well; two cases of acne rosacea, one with very red nose, improving wonderfully; one case of psoriasis; three cases of goiter, in which he used iodine applications driven in with high frequency currents administered with vacuum electrodes. He also reports two cases of birthmark on the face, one in which treatment was recently commenced, and

the other has a 50 per cent. improvement after four months' treatment. He reports also a case of chronic ulceration of the upper surface of the glans penis following chancroids, yielding readily to X-ray treatment after resisting all other treatment for twelve months. One case, doing well, of recurrent fibroma of the eyelid. He reported eight cases of cancer of the breast and one case of the larynx as doing well. One case of cancer of the vagina, which was very much ulcerated, was much improved temporarily, but the case finally did badly and was a failure.

The doctor closes his paper, which is a most excellent one, with a few personal views of many of the most expert and prominent X-ray workers in the country, such as Drs. Margaret Cleaves, Russell H. Boggs, William J. Morton, Clarence E. Skinner and J. Rudis-Jicinsky, and many other prominent authorities, in which they all speak in the most favorable terms of their success with the X-ray.

RADIOGRAPHY.

EDITED BY HERMAN GRAD, M. D.

A Contribution to the Diagnosis and Treatment of the Surgical Diseases of the Ureter and Kidney. By F. Kreissl, M. D., Medical Brief.

Hematuria, Nephrotomy, Recovery. — "Patient forty-five years old. In March, 1902, hematuria, accompanied with tenesmus at times. Rest in bed for several days reduced the quantity of blood materially, sometimes so much that the urine, microscopically at least, seemed to be almost clear, but the hematuria returned very soon after the patient was up and around for a few hours.

"Examination, October 10, 1902.—Inguinal glands and external genitals apparently normal. So is the prostate, and the seminal vesicles, which are outlined without difficulty, the patient being thin and emaciated. No tenderness over both ureters and kidneys. The left kidney distinctly larger and more resistant than the right one. Heart and lungs normal. No family history of consumption or malignant growth, nor of a preceding lues, or a trauma. The urethral wall, seen through the urethroscope, appears normal. So is the bladder, inspected through the cystoscope. From the right ureter, clear urine is secreted, while bloody urine is emitted from the left side. Ureter catheter, No. 8, French scale, is passed without difficulty into the renal pelvis, and from there the bloody urine collected for examination. The same procedure on the right kidney furnishes clear urine. The next thing to do was to find the origin of the hematuria, of which, excluding a gumma of the kidney and the still hypothetical essential hematuria, there remained as the

more common cause tuberculosis, stone, malignant growth, or nephritis.

"The result of the examination of both urines by the Columbus Laboratory is given here:

"*Urine from Right Kidney.*—Clear amber color, very little mucin, stained slides negative, few leucocytes, few epithelial cells. Urea, one per cent. Freezing point, 1.8° C.

"*Urine from Left Kidney.*—Cloudy, reddish color, albumin present, stained slides show leucocytes, epithelium, few single cocci; tubercle bacilli absent. Blood present, five-tenths per cent. Pus absent, numerous epithelial cells. Urea, 1.1 per cent. Freezing point, 1.6° C.

"In the skiagraph taken the following day a shadow was noticed, the density and position of which might permit the diagnosis of a calculus of the ureter caught at its third narrowing in the bladder wall, but closer study of the comparative proportions of this pelvis made it evident that the shadow was not a ureter calculus. The distance of each ureter from the median line is less than one inch. If in this case this distinct shadow was a ureter stone, it ought to be about midway between the median line and where it appeared on the picture. A second exposure, made four days afterwards, showed the same condition. Inasmuch as I had no difficulty in passing a ureter catheter up the ureter, and obtained the bloody urine direct from the renal pelvis, I thought myself justified in eliminating the existence of a stone in the vesical portion of the ureter, or its possible bearing on the hematuria.

"To get to the cause of the latter, I made a lumbar incision, October 15th, and found a very large, congested, cyanotic kidney, but macroscopically nothing pathologic on its surface, nor on the cut surface of the parenchyma, in the calices or the renal pelvis. A good-sized elastic bougie was easily passed down the ureter into the bladder without encountering an obstruction. The urine was closely inspected for three weeks following the operation, but no concrement found, neither could a stone be seen in a subsequent cystoscopic inspection of the bladder cavum.

"Patient is gaining in weight since he left the hospital. The urine cleared up in the second week after the nephrotomy, and has remained free from albumin and blood, both macroscopically and microscopically. If one had relied upon the X-ray picture alone, the result would have been at least an unnecessary searching for the calculus through a supra-pubic opening, and an incision in the vesical end of the ureter. But aside from this X-ray fallacy, and its possible consequences, there is another point of interest attached to the case and its present termination. It brings up again the question, Is there such a condition as "essential hematuria," or are all hemorrhages from the kidney symptomatic, as most authorities believe?"

The case is certainly one of great interest. A distinct shadow was shown on the plate. The question now is, How was that shadow produced? That a No. 8 French bougie failed to be arrested shows that the ureter is patent, and yet that organ may harbor a stone. It might have been of advantage to have used a waxed bougie and watched for scratches on it, after its withdrawal from the ureter. A radiograph may disappoint in not assisting in our diagnosis, but when a shadow is shown in a well-executed plate we can rely on the fact that the shadow is caused by an obstruction to the free passage of the X-ray, and that something is there to cause the obstruction. To see a shadow on the plate is easy enough, but the interpretation of it is at times difficult, as the author well says.

"In reviewing these cases, it is evident that no single method of examination in this particular field of surgery can always be relied upon implicitly in making a diagnosis."

H. G.

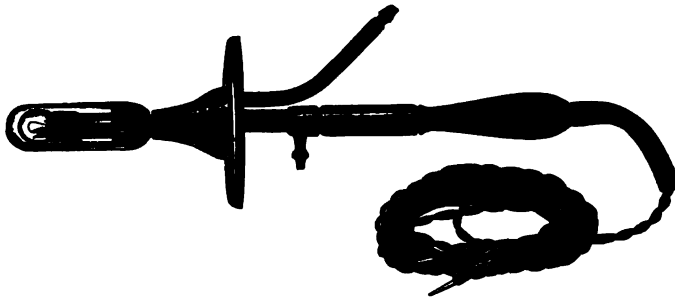
PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Photospeculum, An Appliance for Phototherapy in Gynecology.

Makaveyeff has invented an appliance which is a combination of a vaginal tubular speculum with an incandescent electric lamp that can be used for transmitting the effect of light upon the internal genitals in women.

Very good results according to the author have been obtained by the use of light, especially in the treatment of



chronic diseases of the uterus and appendages accompanied by neuralgic pains. Applications may be made through the abdomen by means of the ordinary incandescent lamp with a suitable reflector, as electric light does not affect the surface of the body alone, but penetrates into the deeper tissues. Two types of apparatus have been devised by the author in which small lamps can be introduced into the vagina. Their size is such that they do not give off an undue amount of heat.

The first apparatus consists of the ordinary glass speculum, into the distal end of which is inserted a stopper fitting into its lumen, which bears the stem of a small lamp through which the two wires supplying the current are passed. The second appliance consists of two glass tubes shaped like test tubes, one within the other and provided with a metallic collar uniting their open ends. The electrodes leading to the lamp within the inner tube pass through the center of this collar.

The space between the glass tubes is connected with inflow and outflow tubes so that a continuous current of water may be maintained around the lamp. The flow of water is maintained at body temperature during applications of from five to twenty minutes. The first lamp requires ten volts, the second fifty volts. With a water rheostat in circuit the operator is enabled to use a street current of from 100 to 110 volts.—Russky Vrach, May 3, 1903.

Remark:

Some ten years since the writer devised a water-cooled vaginal lamp for the purpose of demonstrating the possibilities of transillumination of the pelvic tissues. This she presented to the American Electro-Therapeutic Association at its fourth annual meeting and described it in her report to the association on "Electric Light as a Diagnostic and Therapeutic Agent." With it the tissues were transilluminated within two inches of the umbilicus, but nothing demonstrated save the course of the blood vessels. In transilluminating the pelvis it was found that wherever there was morbid material, either in the form of exudative matter or abnormal growths as fibroid tumors, sarcoma, etc., the tissues were not transilluminated but remained absolutely black. This transillumination of the pelvic organs was regarded however as of doubtful utility, and the lamp was laid aside. Then came the discovery of Roentgen, rendering transillumination even of less value than before. Recently, however, the writer has been using this lamp therapeutically in the same class of cases as Makaveyeff to determine the value of a water-cooled vaginal lamp in gynecological work. The lamp bulb is placed within a glass tube perforated at its distal extremity in order to maintain a continuous flow of water, and both lamp and tube are sealed, by means of a metal collar, into the hard rubber device which serves as the transmitter of the water into the sealed chamber, the wires into the lamp, as well as to hold the lamp in situ when in use. It requires 32 volts and .8 ampères, giving about 8 candle-power. One of the first vaginal lamps used by the writer was a 20-candle-power.

With this lamp all the radiant energy of an incandescent light which passes through glass can be utilized. There can be no or but little effect from the short high frequency waves or ultra violet rays of light because of the glass enclosing the lamp filament as well as the water-cooling tube, and whatever effect is obtained is due to the luminous rays. The heat rays are also eliminated. As yet the writer is not prepared to estimate the therapeutic value of the rays which are permitted to pass independent of the lower and higher frequencies which are eliminated in the one instance by the water and in the other by the glass, but there is no question as to the value of the light vibrations secured by this device.

In all malignant cases the electric arc is used independent of any lens and to the parts rendered anæmic by adrenalin or by filling the speculum with ice. This water-cooled vaginal lamp is a simple one and can be used on a 110 volt direct current circuit with a resistance of two 16-candle-power lamps.—Editor Department Phototherapy.

PSYCHIATRY.

EDITED BY MAURICE F. PILGRIM, M. D.

How the Mind Rules the Body. Abstracted from the Dietetic and Hygienic Gazette for August, 1903.

Professor W. G. Anderson, of Yale University, lately succeeded in practically weighing the result of a thought's action. A student was placed on a "muscle-bed," poised on a balance so that the center of gravity of his body was exactly over its center. When he was set to solving mathematical problems, the increased weight of blood at his head changed his center of gravitation and caused an immediate dip of the balance to that side. Repeating the multiplication table of nines caused greater displacement than repeating the tables of fives, and, in general, that displacement grew greater with greater intensity of thought. Carrying the experiment further, the experimenter had the student imagine himself going through leg gymnastics. As he performed the feats mentally, one by one, the blood flamed to the limbs in sufficient quantities to tip the balance according to the movement thought of. By purely mental action, the center of gravity of the body was shifted four inches, or as much as by raising the doubled arms above the shoulders. These experiments were repeated on a large number of students with the same result.

To test still further the mastering influence of mind over muscle, the strength of the right and the left arms of eleven

young men was registered. The average strength of the right arms was one hundred and eleven pounds; of the left arms, ninety-seven pounds. The men practiced special exercises with the right hand only for one week. Tests of both arms were again made, and while the average strength of the right arm had increased six pounds, that of the unexercised left arm had increased seven pounds. This showed clearly that the brain action connected with the gymnastics developed not only the muscles controlled by the same portion of the brain. This could only come about by sending blood and nervous force to the proper parts by purely mental action. Professor Anderson says of the results:

"I can prove by my muscle-bed that the important thing in all exercises is the mental effort put forth. I can lie down on this muscle-bed and think of a jig, and though apparently my feet do not move and actually the muscles are not active, the muscle-bed sinks towards my feet, showing that there has been a flow of blood toward the muscles, and that if I did dance a jig, the muscles would be well supplied with blood under this mental stimulus."

Bodily Exercise without Thought is of Little Use.

Sandow has long taught that bodily exercise without proper thought would do little to develop muscles, and that a very little exercise, with the mind directing it, will practically rebuild the body. Certain professors of physical culture are selling this knowledge for good prices. Professor Anderson's experiments demonstrate the truth of these statements, and, further, that exercise involving competition and lively interest in games does far more good than merely mechanical movements, performed without interest in gymnasiums. He says that walking is poor exercise for brain workers, as it is so purely automatic that it does not call the blood from congested brain centers, which go on solving intellectual problems. A run, a brisk walk, with a definite object necessitating the thought of speed, will send the blood to the legs and build them up.

Before these experiments at Yale University, Professor Elmer Gates, at Washington, had claimed that he was able, by thinking intently of one of his hands, when it was immersed in a basin full of water, and willing that the blood should flow there, to make the water overflow. Thus the amount of extra blood sent to the hands could be measured, since it corresponded to the overflow of water.

Recent experiments on dogs by the European scientist, Pawlow, have proved conclusively that secretion of the gastric juice in the stomach does not, as long supposed, take place automatically when saliva is secreted or when food enters the stomach. On the contrary, it is secreted when a dog is made to anticipate that it is to be fed with a much-loved food, as raw

meat, even though that meat is not given it, or, if given, is not allowed to pass into the stomach, but drops out of the esophagus by a slit made for that purpose. All kinds of mechanical irritation did not avail to cause a flow of gastric juice unless there was excited an idea of pleasure in eating. If the pneumogastric nerve was severed, even this anticipated gastronomic pleasure, or the actual passage of the loved meat through the severed esophagus did not cause gastric secretion. The part of the mind in what has been called mere mechanical or physical functions has been thus shown. The psychological side of digestion, as of every other manifestation in the body, is the more important.

The experiments of Professor Anderson with his muscle-bed are full of scientific interest. They are of interest to everyone, because they demonstrate in the most positive and convincing manner the fact which many are inclined to deny, that the mind really controls and directs every physical change which occurs within the body.

They are of especial interest to physicians by showing them how necessary it is, regardless of whatever else may be necessary, not only to secure the mental co-operation of the patient in all things done by others for his recovery, but to direct his mind and keep it operative in channels which will compel it to contribute directly to his own cure.

Moreover, to all practitioners of kinesitherapy, they afford a satisfactory explanation of the superior curative value of duplicated or resistive movements which are so successfully used in the treatment of many chronic forms of disease.

It has long been known that in the treatment of certain diseases "movements," or curative exercises in which the patient is allowed or made to participate, are much more effective than when the same movements are made by the operator, with the patient remaining passive. In the light which these experiments shed, the reason why duplicated movements are so markedly helpful becomes very plain. It is because not only the mind of the patient, but, also, that of the operator, is concentrated upon that limited portion of the body which the movement includes, stimulating all of the physiological processes within this area, and calls forth in this manner all of the curative power which the system is capable of exerting.

J. Lincoln Brooks, in a recent issue of *Success*, says: "Thought is being recognized more and more at its proper value in the work of the world, material and moral. By people of views varying greatly in detail, the power of thought is stated to be almost omnipotent in human affairs. Practical demonstrations of seemingly marvelous results are now convincing unthinking and material minds. Scientific experiments, instead of destroying the claims of the thinkers, substantiate them, and give scientific explanations."

Tissot says: "All the medicine in the world cannot be substituted for exercise."

DEPARTMENT OF MECHANICAL VIBRATION-THERAPY.

EDITED BY FREDERICK H. MORSE, M. D.

A Case of Hemiplegia (Complicated with Persistent Insomnia) Successfully Treated by Mechanical Vibration. Reported by Walter H. White, M. D., ex-President of the American Electro-Therapeutic Association.

Mr. H., age thirty-nine, occupation, officer for past eleven years on a coastwise steamer, had been overworking for quite a considerable time previous to the attack of cerebral hemorrhage which culminated in right hemiplegia. For nearly a year preceding the initial lesion, patient had experienced prodromic symptoms of impending trouble, but ignored them and did not seek professional advice. Some of these symptoms were blurring and indistinctness of vision, attacks of dizziness, nausea and vomiting.

At the first consultation (on September 28, 1902), patient complained of a "prickling" and benumbed sensation in his right arm. Tested with the dynamometer with this result: Right hand, 55; left hand, 70; was unable to voluntarily raise the right arm. Right leg was dragged when walking. In addition to this unilateral loss of muscular motion, patient was a persistent sufferer from insomnia.

Began treatment with electricity (from a 12-plate static machine) September 28, 1902, which was regularly continued until November 30, following. Patient being then obliged to relinquish his work, treatment having proven disappointing, left the city. Upon his return, he again resumed electrical treatment February 11, and continued it regularly three times a week until May 22, when it was discontinued. While the patient had gained in strength and his general appearance was improved, he was still unable to use his right hand in handling small articles and was very liable to stumble when walking. Mechanical vibration was now substituted for the electricity. The ball was applied in the interspaces over the transverse processes of the spinal column from occiput to the last sacral vertebrae. The arm and fingers of the affected arm were also vibrated by means of the brush attachment. Under these applications the patient commenced at once to gain and so continued until now (July 26) he has resumed the discharge of the duties of his former position and *is able to use both his hand and leg freely and without difficulty and naturally.* His insomnia also yielded promptly to the vibratory treatment.

BOOK REVIEWS.

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS, in eleven octavo volumes; A Practical Exposition of the Methods, other than Drug-giving, useful for the Prevention of Disease and in the Treatment of the Sick. Edited by SOLOMON SOLIS COHEN, A. M., M. D., Senior Assistant Professor of Clinical Medicine in Jefferson Medical College, Physician in Jefferson Medical College Hospital, etc.

Volume X., Pneumotherapy, including Aerotherapy and Inhalation Methods and Therapy, by Dr. PAUL LOUIS TISSIER. One-time interne of the Paris Hospitals, Assistant Consulting Surgeon to Laennec and Lariboisiere Hospitals, Chief of Clinic of the Faculty of Medicine of the University of Paris. Illustrated. 450 pages. Published by P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa. Price, \$28.50 net for set.

This new volume of Dr. Cohen's excellent series adds a new work to a subject which, to the present time, has received relatively little attention. In the work considerable attention is paid to the history and development of pneumotherapy as a therapeutic measure, and the writers rightly call attention to the fact that the subject has not been accorded due consideration in the past.

Part I. treats of Pneumatometry and Spirometry, The Uses of Air Modified in Composition and Temperature, Effects of Compressed Air Baths, the Pneumatic Chamber as Well as the Effects and Uses of Rarefied Air. Physiological Effects and Therapeutic Uses of Differential Pressure and General Perspiratory Gymnastics are accorded due consideration.

Part II. treats of Inhalations Methods, Including the Therapeutic Uses of Gases and Vapors, with a thorough discussion of methods, apparatus, and the therapeutic indications of their employment. The work contains 116 illustrations and has been carefully prepared, and will make a valuable addition to the physician's library.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

A MONSTER STATIC MACHINE.

Several large static machines have been built and are in use in this country. They are of various types with glass plates in diameter up to six feet. A static machine with six-foot plates must have a "small house" as a case, and must be built

into the room or the building where they are to be used. Machines with extra-large plates and few in number seldom come up to expectations as regards efficiency. The accompanying cut shows what is probably the largest practical static machine in America. It has 12 revolving plates 40 inches in diameter, and 12 stationary plates 44 inches in diameter. They are made of a special colorless American glass 0.136-inch thick. In building this machine the general lines of a modern Toepler-Holtz were followed, and as such is self-charging. To the



shaft is attached a 1-H. P. electric motor. Some astonishing results are obtained with this machine in action. With a pair of 2-gallon Leyden jars attached the sparks obtained are 20 inches long and of tremendous volume. The vibrations set up in the air may be felt 6 or 8 feet away. A book an inch thick is easily punctured. A folded newspaper held between the discharge balls is torn to pieces. Upon a sheet of glass 5 feet long and sprinkled brass filings, the spark may be made to pass the full length.

This machine is built by Messrs. N. O. Nelson & Co., No. 171 E. Randolph Street, Chicago.

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THE CURRENT: ITS EFFECTS AND PHYSIOLOGICAL ACTION.

CHAPTER II.

BY MARGARET A. CLEAVES, M. D.

The effects of the continuous current which concern the physician most nearly are (1) physiological and (2) chemical. It is possible that there are physiological effects due to the nervous stimulus, which can be distinguished ideally, at least, from those due to direct chemical or physical action. Long since, however, the opinion was expressed by Du Bois-Raymond that excitation with the continuous current was nothing more than the first stage of electrolysis in excitable tissue, and the consensus of opinion to-day is that this is the correct definition of the physiological action of the current. It is necessary, therefore, before considering the physiological effect to proceed at once to a discussion of the chemical effects of the current.

There are four ways in which electrolysis can affect, in the living body, such tissue as muscle by its chemico-physical action:

(1) By the chemical effects of the products liberated at the electrodes or in the substances of the tissues;

(2) By the removal of electrolytes (chiefly inorganic substances) which are necessary for the vitality of the tissues, leading to increased absorption of the elements, and, perhaps in consequence, to increased activity of the general nutrition in the tissue, or, if the action be more intense, to diminished vitality, degeneration or death;

(3) By cataphoresis, leading to increase of transferred substances around the cathode, diminution around the anode and

the consequent increase of eliminating or absorbing activity, by which a tissue returns to healthy equilibrium, or to any of the results which follow the disturbance of that equilibrium beyond the limits of health;

(4) By raising the local temperature in both cases, but the physiological change may be very different.*

So far as conductivity is concerned, the human body may be regarded as .6 per cent. of a one per cent. solution of common salt. It conducts by reason of its inorganic constituents, which, in connection with the fluids, constitute a normal physiological saline solution.

Whenever a current passes through a tissue or proteid solution it is conducted almost entirely by the salts contained therein. Chemical effects produced on the proteid constituents are due to secondary actions of the products of electrolysis of the salts, and will be demonstrated later on. Therefore, when a current passes through living tissue it produces two effects, physiological and chemical.

The first, or physiological effect, is dependent upon the second or chemical.

The physiological follows the changes which take place in the tissues as the result of the chemical action. From a current of short duration, a physiological action is always produced, as, for example, with a shock from an induction coil. Therefore this is selected to establish the function of excitable tissues. Such a shock, however, while adequate to excite maximum muscular contractions, is capable of very slight electrolytic effect; *i. e.*, an effect characterized by the products of electrolysis at the poles. Now, with the continuous current, a very different effect is produced when it is gradually increased from sub-minimal strength. There is no excitation of excitable tissues.

So far as it is at present known no current can pass through such a mass of materials as that of which the human body is composed without effecting electrolytic decomposition, or, in other words, the only medium of conduction in such a mass is chemical decomposition or electrolysis. It does not matter whether it is a continuous or an alternating current, electrolytic effects are produced not only in the medium immediately sur-

* On Electrolysis of Animal Tissues. G. N. Stewart. Studies from Physiological Laboratory, Owens College, Manchester, England.

rounding the poles or electrodes, but also in the intrapolar or intervening tract. But with all forms of alternating currents, high frequency as well, little, if any, accumulation of electrolytic materials takes place at the poles.*

The continuous current, on the other hand, is characterized by polar action, *i. e.*, the accumulation of the products of electrolysis at the poles, and upon this fact therapeutic indications are based, as will be seen. Profound chemical changes are established which may result in the death of the tissue, as, for example, in the puncture of a mole. Here the current is turned on gradually. There are no muscular contractions, but in a few moments' application there is complete destruction of the growth by the chemical action of the current, and the resulting interference with the circulation.

A given quantity of electricity passed in the form of a series of swift shocks, by a uni-directional current, may throw an animal into violent tetanus, may exhaust the muscles and nerves, and lead to gradual or sudden death; while the same quantity passed as a continuous current may leave scarcely any visible physiological effect. The amount of chemical decomposition caused by the current will be the same in both cases, but the physiological changes will be very different.

Under the chemical effects of the current, electrolysis and phoresis are to be considered. It is impossible to dissociate these two effects, as they are closely allied, and do not take place independently the one of the other. This will be clearly shown by the experiments to be described in the following pages.

By electrolysis is understood an electro-analysis of the fluids and salts of the tissues, which serve as electrolytes. By phoresis is understood that particular kind of osmose due to the action of an electric current passing through a porous septa, no matter what its direction. But *the* direction of the current is from positive to negative or from the anode to the cathode; and, therefore, cataphoresis is the most characteristic phenomena of the phoretic action.

Just here it is best to have it distinctly understood that in these pages the term cataphoresis is never used to refer to the introduction of drugs into the tissues of the body, by means

* Houston and Kennelly. "Electricity in Electro-Therapeutics." Second Edition. pp. 348-350.

of an electrical current. This is to avoid confusion, as the physical phenomena of electrical osmose is always known in electro-technics as cataphoresis. When it comes to speak of the introduction of drugs, suspended in or held in solution by a liquid, by the action of the current the phenomena will be described under the head of cataphoric and anaphoric medication, according to whether the substance in question tends to seek the cathodes or the anode.

The transfer of the products of electrolysis, as well as a transfer over and above the electrolytic action, electrical endosmose or cataphoresis, is a physical phenomena of the current only upon an electrolyte such as the human body. This will be demonstrated in subsequent pages.

"The more modern theory of electrolysis regards the conduction of electric currents through all substances except metals, as a convective action, in which only free atoms or radicals can take part; that is to say, a molecule of any substance is incapable of conducting electricity, except in the case of metals. Where molecules, however, are dissociated into their atomic constituents, that is, into free atoms or radicals, these constituents are capable of receiving and conveying electric charges, and so become the medium of transport in an electric current. As a consequence of this, the atoms after having delivered their electric charges accumulate at the electrode to which they are directed." *

A molecule always consists of two parts called ions or radicals and these are named, respectively, the electro-positive and the electro-negative ions or radicals.

Electrolysis occurs in the external circuit, and upon electrolysis rests, fundamentally, the therapeutic applications of the continuous current. If the platinum tipped free ends of conducting cords connected with a source of continuous E. M. F. are dropped into a glass of ordinary tap water (pure water is practically a non-conductor) chemically H_2O , a decomposition at once takes place as the result of the action of the electric current upon the water. By this action the water is decomposed and the hydrogen, the electro-positive ion or radical, proceeds to the negative pole or cathode, while the oxygen, the electro-negative ion or radical, proceeds to the positive pole or

* Houston and Kennelly. "Electricity in Electro-Therapeutics," page 256.

anode. The presence of free oxygen and hydrogen at the respective poles can be demonstrated, but the action which goes on in the interpolar region is not appreciable to the eye. The electric charge is conveyed from one atom to the other throughout the interpolar circuit, each in turn becoming electro-positive to the next atom, the free radicals or ions appearing at the poles. This action at the poles is easily observed.

At the positive pole will be seen a few gas bubbles, or the electro-negative ions or atoms of oxygen, while at the negative pole the action is very much more marked and the platinum tip is completely enveloped in the electro-positive ions or atoms of hydrogen set free. As water chemically contains two parts of hydrogen to one of oxygen, it follows that the excess of bubbles would be at the pole to and toward which the hydrogen atoms tend, viz., the negative pole.

If sodium chloride be added to the water conductivity is increased. This is not due to the presence of either the sodium chloride or the water separately, but it is a property of the solution. Immediately the Na Cl is added to the water, before the action of the current, it is in a condition of ionization.

The same is true of the fluids and salts of the living body, that they are in a state of ionization—a condition which renders them the best form of an electrolyte.

To demonstrate the action of the current upon tissue which approximates most closely that of the body, the following experiment is of value:

Take a piece of lean beef, preferably from the rump, as it contains but little fat and is therefore best adapted to the experiment. Animal fat is a bad conductor. In living tissue it conducts by means of its blood vessels, its connective tissue and its fluids, which are continuous with the strata above and below it. In dead tissue, therefore, its resistance is enormously increased and it practically acts as an insulator.

Two steel needles suitably placed in needle holders and attached respectively to the positive and negative terminals of a source of continuous E. M. F., either a battery of chemical cells or generators, or an adapter for the street current, are introduced into the substance of the meat an inch or more apart, according to the size of the piece of meat selected for the experiment, and the current is turned on.

The structure of the meat conducts as does the human body

by reason of its saline constituents, a point which has been thoroughly elucidated by the experiments of G. W. Stewart, of the Physiological Laboratory of Owens College, Manchester, England.

To these experiments reference will be made from time to time, demonstrating as they do more clearly than anything that has been done, the action of the current in medical applications.

Returning to the experiment, nothing can be seen going on in the region between the two needles, but directly at the site of the needles the careful observer will note the following: About the anode as the current flow is maintained, there will be noted a dry appearance of the structure of the meat markedly in contrast to its normal condition.

There will also be observed an accumulation of gas bubbles, and if a high current strength is used a strong smell of chlorine will be perceived. At the cathode, on the other hand, a moist turgescient condition of the structure of the meat, much in excess of its normal moisture, is apparent, the tissue around the needle is much redder than normal and gas bubbles are also observed, but much less marked than at the anode. At the latter there is not only free oxygen given off, but chlorine gas as well, hence the excess.

If, after five minutes' application of the current, the needles are withdrawn and a test made with litmus paper, the fluid around the anode as well as the substance of the meat itself will be found to give an acid reaction; while that around the cathode will be found to give an alkaline reaction. This is greater or less according to the amount of current which has been used, according to the time covered by the experiment and also by the initial character of the meat used, that is, as to freshness and quantity of blood remaining therein.

The greater part of the alkalies thus formed at the cathode are hydrates of sodium and potassium but the hydrates of ammonium and calcium are unquestionably present, and the bubbles of hydrogen given off are due to the decomposition of water by the cations; while at the anode acids are formed by the action of the anions on water and gas is given off, in most cases oxygen principally, but chlorine is always present as well. If the finger is then placed upon the anodic area of the

meat, it will be found to have a hard, indurated feel; while the structure of the cathodic area, on the contrary, is soft and yielding to touch. At the anode the tissue has lost its moisture; at the cathode there has been a gain in the amount of fluid.

Careful qualitative and quantitative analysis will show that there is an actual loss at the positive pole of the fluids and of the salts of the tissues as well; while at the negative pole an excess of fluids and salts can be determined. Upon conclusion of the experiment, the negative needle is easily withdrawn and it is found to be bright and untarnished. There is no adherence whatever to the tissues. The positive needle, on the other hand, is withdrawn with difficulty, as it is adherent and it is more or less darkened and corroded according to the amount of current and time consumed in the experiment.

This condition is one of oxidation produced by the action of the chemicals set free at the positive pole upon an oxidizable metal, and is a fundamental physical fact utilized in one of the most important methods in continuous current therapy, and which will be considered under the head of Metallic Electrolysis.

There has been a decomposition, recombination and redistribution of the fluids and salts of the piece of meat subjected to the experiment. Conduction has been made possible by the conveyance of the charge from atom to atom in the inter-polar circuit. The decomposition affects the fluids and salts primarily, and there is a movement from the anode to and towards the cathode of the fluids and salts, while at the negative pole the cations, hydrogen and the bases appear, forming hydrates of sodium, potassium, ammonium and calcium. On the other hand, there is a slight movement from the negative to the positive pole, but very slight as compared with the movement to the negative. At the anode the anions, oxygen and chlorine are set free and phosphoric sulphuric hydrochloric and nitric acids are formed. Thus the passage of the current is accomplished by the stream of ions moving in opposite directions through the structure of the meat.

In the presence of the alkalis at the cathode oxidizable metals remain unaffected, but the reverse is true at the anode.

If the experiment were repeated with platinum needles there would be no action upon the needle at the positive pole, as

platinum is a non-oxidizable metal. Other than this, the experiment remains the same.

In addition to the decomposition or electrolysis of the inorganic constituents of the meat, there is a transfer of fluid from the anode to the cathode, which on the superficies of a piece of fresh meat is demonstrable under a magnifying glass and is clearly shown by the utter dryness at the positive needle and the moisture at the site of the negative needle. This will be demonstrated more clearly when considering cataphoresis.

In order to determine the effects of the liberated products of electrolysis, Stewart subjected living frogs' muscle to the action of thirty-five milliamperes of current, five milliamperes per square centimeter of surface, for two hours. The muscle was cut into small pieces and placed in a glass trough, a sample being kept for control.

The muscle remained excitable for seventeen minutes. A strong smell of chlorine was given off at the anode. At the end of the experiment the current had sunk to five milliamperes, although the electromotive force was the same as at first. This was due to the increased resistance of the mass from the action of the current upon its electrolytes.

The cathodic layer was strongly alkaline throughout its entire depth and had a brownish tinge. The anodic layer was acid and almost colorless.

Under the microscope in the anodic layer, the most striking change was the distinctness of the nuclei. They were seen in great numbers and appeared just as though acted upon by acetic acid. Everywhere the fibers were bound by a sharply defined and uninjured sarcolemma, no matter how great the change in the contents might be. The sarcolemma, which resists the action of chemical agents so much, resists also the action of electrolysis, a fresh indication that it is the secondary chemical changes which are chiefly concerned, at least in the immediate effects of the current. Every gradation of change was shown in the fibers; in some there was complete destruction, the striation and the nuclei being gone and nothing remaining in the sarcolemma, save a granular structural mass. This was comparatively rare, however.

In many of the fibers there was no change in the transverse striation and in fact no change at all, save in increased prominence of the nuclei. In others again, the transverse striation

could still be made out, but less clearly than in normal muscle. On the other hand, the longitudinal striation was well marked and could sometimes be seen where the transverse striation was entirely destroyed. These changes were not simply confined to the surface next the electrode, but penetrated through the entire anodic area.

In the cathodic layer, there was, first, a thin stratum, next, the electrode, consisting of clear jelly-like material. In this layer, the fibers, for the most part, showed neither nuclei nor transverse striation, but the longitudinal striation was quite distinct.

The sarcolemma was well marked, and the contents were not granular, but nearly homogeneous. A very few nuclei were seen. This, says Stewart, whose experiment is quoted at length, is *the region of utter destruction*. In the rest of the cathodic layer the condition of the fibers resembled that of the anodic layer, except that the nuclei were not seen.

The transverse striation was sometimes unaltered, often greatly impaired or destroyed. A few fibers showed only homogeneous contents.

In the anodic layer it was noted that the destruction of the fibers rendered the contents granular, as if it were a coagulation, while destruction in the cathodic layer was associated with a homogeneous appearance of the fibers, as if it were due to a solution of the contents, or a chemical alteration other than a coagulation. Chemical examination confirmed this impression. These physical conditions are of the utmost importance in the therapeutic uses of the current, and it is well, therefore, to emphasize at this point the conclusions reached by the experiments of Stewart, viz., that while the cathodic area immediately about the electrode is a region of utter destruction, there is a destructive action at both poles, at the anode by reason of a coagulation and at the cathode by reason of the chemical action.

(To be continued.)

THE ROENTGEN RAY AS AN AID IN DIAGNOSIS.*

BY HERMAN GRAD, M. D., NEW YORK.

The observations and studies of the phenomena of the Geissler tube resulted finally in the discovery of the so-called X-rays. In the Geissler tube, the air has less pressure than that of the atmosphere, hence the resistance offered to the flow of electricity is proportionately less. The imprisoned gases in the tube, under the action of electricity, take on a glow. In 1869, Hittorf made the observation, that if electricity is allowed to flow through a Geissler tube for some time, in the same direction, or if the air in the tube is rarefied by exhaustion, the usual phenomena observable in the Geissler tube ceases, and the glass of the tube begins to fluoresce, the fluorescent tint of the tube depending on the quality of the glass of which the tube is made. This observation of Hittorf was very important, and it might be said that it was the first step which led up to the discovery of the X-ray. It was also observed that only that part of the wall of the tube fluoresced which is struck by the rays emanating from the point where the negative pole of the electricity is attached. The rays coming from the negative pole have been termed cathode rays by Crookes and others. If the negative electrode of a Crookes' tube is made into the shape of a round, concave disk, the rays emanating from it can be concentrated to one point, and a metal disk placed at this point will become red hot, or even be brought to a melting point. This shows conclusively that the cathode rays obey the laws of reflection. The cathode rays do not penetrate the glass of the vessel when they are formed, but are converted into heat as they strike the wall of the tube. The cathode rays always project at right angles to the negative pole, and quite independent of the position of the anode of the tube. It is an interesting fact that a magnet brought near the cathode rays causes them to be deflected from their course. This is true only of the cathode rays, as the X-rays cannot be deflected by the magnet, or by any other means, as yet known. These observations of the phenomena of electricity where the atmospheric resistance to its flow is re-

* Read at the thirteenth annual meeting of the American Electro-Therapeutic Association, held at Atlantic City on the 24th of September, 1903.

moved led up to the remarkable discovery of the so-called X-rays, by Wilhelm Conrad Roentgen in 1895. Roentgen discovered that at the point where the cathode rays impinge on the wall of the Crookes' tube a new kind of ray is produced. These rays, unlike that of the cathode rays, do penetrate the glass wall of the tube, and are entirely invisible to the eye, but capable of affecting the ordinary photographic dry plates. The so-called collodion plates are not affected. These newly discovered rays produce fluorescence of barium platino-cyanide, and penetrate objects that are otherwise opaque to sun or artificial light. These opaque objects, when placed in front of these rays, and their shadows allowed to fall on a screen made of platino-barium cyanide, become visible. Some substances offer more resistance, and others less, to the passage of the X-rays. Experiments have shown that metals offer greater resistance than other substances, although aluminum is very pervious to the X-rays.

The original Crookes' tubes were pear-shaped, and as the negative pole of the tube was a flat disk, the cathode rays spread over a large field. The image produced on the plate by the X-rays from such a tube were necessarily much distorted. In these tubes, also, the X-rays were produced at the point where the cathode rays struck the wall of the tube. In order to obtain a sharp picture on a plate it is necessary to have the source of light for photography emanate from one point. With the X-ray tube, this is accomplished by making the cathode a concave disk, and placing the anode at the focal point of the concavity of the cathode. This arrangement of the cathode and anode in the X-ray tube was a most important step for successful radiography and radiotherapy, as intensity and concentration of the rays is thereby obtained. A further important step was made in this line by Herbert Jackson, when he placed the anode at an angle of 45° , and thus brought the rays to a definite section of the wall of the tube. In a tube that is acting to its fullest capacity, we find that the anode comes to a red heat. It is also observable that such a tube after a while will cease to functionate. Such a tube is spoken of as becoming "too high." It is believed that a change has come about in the vacuum of the tube, and that the vacuum has been greatly increased. What has become of the matter that was originally in the tube? Has the heat of the anode

brought about changes in it? Some observers claim that the particles of matter have been changed, and have been thrown against the glass, thus lining the interior of the bulb of the tube; others again believe that the matter originally in the tube has actually been forced through the pores of the wall of the tube. Be this as it may, we know that a tube, after it has ceased to functionate, can be made active again by lowering the vacuum. Where no special arrangement is made by the manufacturer for lowering the vacuum of the tube it can be lowered by heating it for a few minutes. It is an interesting fact that a tube having become too high, will become useful after a long period of rest. The heating of the tube is best accomplished by placing it in an oven.

In allowing the Roentgen rays to penetrate animal tissue, we find that the bones offer greater resistance to the passage of the rays than the softer structures. In fact, osseous structures throw a marked shadow on the fluoroscopic screen.

The discovery has been a great boon to suffering humanity, and a resplendent star in medical diagnosis. By means of these interpreting rays, diagnosis can be formulated with an accuracy and precision little dreamed of by our fathers of medicine. The X-ray discloses obscure affections of the body so vividly and completely as almost to rival the reflections of a mirror. To-day, in formulating a diagnosis, not only can we hear, feel, and see, but, with the aid of the Roentgen rays, see light where formerly was darkness; see shadows where formerly we relied on the feeble sense of palpation, observe solutions of continuity of bone where formerly we but guessed at a break.

Were this all that we could say for the X-ray in medicine it were, indeed, a boon to mankind with its many ills, but this is but a drop in the ocean of possibilities of this potent physical force. The great value of the therapeutic properties of the X-ray, indeed, far surpasses this.

With the aid of these rays, we are able to influence affections for the better that have baffled the efforts of medical science for centuries. Briefly said, in the Roentgen rays, medical science has found a potent and powerful therapeutic agent whose possibilities we but dimly discern, and whose actualities experience with this agent has abundantly demonstrated, we shall jealously guard until medical science can measure out

its proper dosage, state its physical properties, and direct its proper application. When medical science shall be able to accomplish this, a flood of light will be shed upon the healing art, and the votaries of this art, who so dearly love their profession, will have realized their fondest hopes.

Having, then, in our hands so powerful a means to assist us in diagnosis, let the medical profession freely embrace it, and guided on in its course firmly establish its proper application, and place it at once and forever beyond the pale of the unscrupulous and ignorant. Nothing will help so much to wrench from charlatanism, the parasite of practice of medicine, its nefarious practices, as a widening of the horizon of the field of diagnosis in medicine and surgery. When we can tell our patients with certainty the cause of their ailments, then will they have confidence in our therapeutics, and will not fly to quackery for relief and expression of opinion. In many ailments, no diagnosis is possible to be obtained, and medical science is compelled to say, "I do not know." It is a difficult lesson to learn to say, "I do not know," but many times honesty demands the expression. Is it a wonder that, under such conditions, the patients withhold their confidence in our ability to cure their disease and alleviate their suffering, when they see us folding our arms, and saying nothing?

In medicine, as in every deep apartment of human knowledge, ignorance is darkness. Knowledge is light. Let us have as much light as possible. Let us increase the field of diagnosis by X-ray vision. The stethoscope has its sphere, the ophthalmoscope its field, the microscope its kingdom, and the thermometer reigns supreme in our armamentarium. Let the X-ray top the ladder of means at our command in diagnosis. The microscope examines the minute, the X-ray the gross. We have the microscope, let us have the fluoroscope and plate. The pathologist looks into his microscope, the radiographer looks into his fluoroscope, and scans the surface of his plate, where the one sees the micro the other sees the macro. As we have the wherewithal, let us employ it freely. Surely, if we have the means of looking through the mysterious frame of the human body, we shall be rewarded in seeing, even though the vision is feeble. In looking, thus, we shall gain a suggestion here, and a hint there. As a single word at times recalls incidences of a lifetime, so a single sign may indicate a path. A

shadow may show light. With the Roentgen ray, by looking for a shadow, one may see light, as the following case shows.

A patient was referred to a radiographer because of her severe incessant pain in the throat. She was referred to him as a last resort. The case had been seen by eminent nose and throat specialists, and had been under the care of one of their excellent colleagues. No anatomical changes were observable to account for the symptoms she presented. The diagnosis of her case varied from pharyngitis to hysteria. The most minute and painstaking physical examination failed to give a diagnosis. The aid of the X-rays were finally invoked to assist in the difficulty. The rays were allowed to penetrate the neck and chest. The heart was seen to beat serenely, the ribs moved with each breath, and the majestic rhythm of the diaphragm was clearly seen. The lung tissue gave free passage to the rays. Everything in the chest and neck seemed as nature intended it to be. Peace and harmony seemed to reign. The observer was on the point of giving up the search, when he saw that the central shadow which divides the chest into two unequal parts, was larger than normally. This shadow was then the offending object. Indeed it was, for it was an aneurism pressing on the recurrent laryngeal nerve, causing the pain. Here, then, was a shadow that threw light on an obscure diagnosis.

On casual observation, it would seem that the greatest and most useful field of the X-ray in diagnosis was in fractures and dislocations, but this is by no means so. It is true that its field in fractures and dislocations is brilliant indeed, yet it is equally true that its great worth in formulating an accurate diagnosis in bone pathology is freely attested. In skiagraphy of bone, in fracture or bone lesion, it is difficult to say which is the more brilliant, so great is the aid that it affords in the diagnosis in both cases. In fractures, the solution of the continuity of bone is shown with accuracy and precision, eliminating all guess work on the part of the surgeon. On the other hand, in bone pathology, the skiagraph lends data which equally leads to precision in diagnosis. With a clearly defined and well executed skiagram in our hands, and with careful analysis of the subjective symptoms the patient presents, a differential diagnosis of the bone lesions of syphilis, tubercular, and malignant disease becomes comparatively easy. Again,

when the aid of the X-ray is invoked in the diagnosis of bone disease, not alone does the skiagram assist in the diagnosis of the affection, but it shows at the same time the extent of the lesion, decidedly assisting thereby in the therapy of the condi-

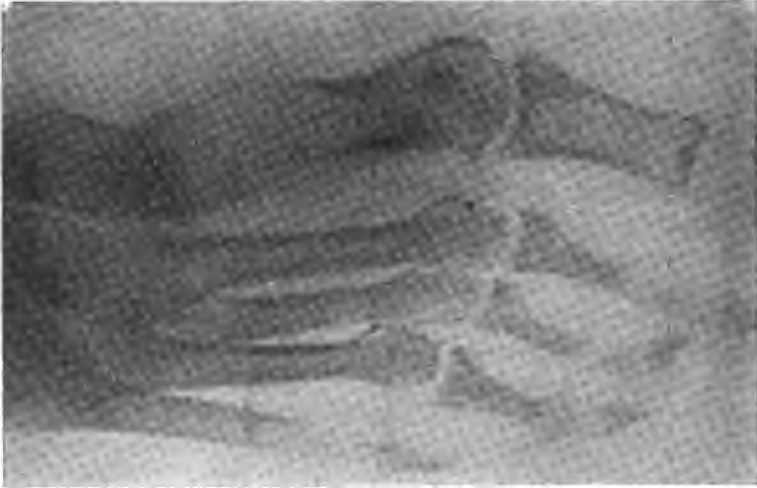


Fig. 1.

tion. It thus becomes an important factor in the cure of the disease, as it shows the surgeon faithfully where to limit his work, and what member or members are affected. It is safe to say at the present day that no diagnosis of bone lesion is complete without a skiagraph, and the surgeon who undertakes to treat a case of bone lesion without a Roentgen ray picture is not alive to the fact that a skiagram mitigates the burden of responsibility of the surgeon, and may be of incalculable value to the patient, to say nothing of how our knowledge of bone pathology is enriched by it. A case came under observation where a young woman of twenty-two was the victim of an enlargement over the metatarsal bone of the great toe of the right foot. (See Fig 1.) The enlargement was of the size of a hen's egg, perfectly smooth, with the skin over the tumor normal in appearance. There was very little pain present. The growth of the mass was gradual, and had been present for four months. There was no history of traumatism. The diagnosis of the condition rested between ostitis, syphilis, tuber-

culosis, and malignant disease. In the absence of inflammatory reaction of the slightest kind, bone abscess was excluded. The skiagraph showed the bone considerably diseased, and the pathological process seemed to have broken through the bone at two places. A diagnosis of malignant disease was made, and an operation advised. The skiagram showed the extent of the disease very plainly, and it was intended to enucleate the diseased bone. The patient disappeared from observation, and entered a hospital, where a diagnosis of abscess was made, and an incision, with scraping of the bone, advised. No skiagraph was taken, on cutting down on the lesion, the expected pus was not found, much to the surgeon's surprise. A piece of bone was then removed for pathological examination, which proved to be a round-celled sarcoma. In cutting in on such a lesion, the patient runs considerable risk of having the surrounding structures infected, and the danger of spreading the disease. Had the bone been removed in its entirety, and the operations been followed by vigorous radiotherapy, a cure could have been effected. In periostitis and osteomyelitis, the skiagraph gives positive information. Abscesses are clearly defined, and the X-ray pictures mark out the surgeon's work. Inflammatory foci are clearly defined, and in exposing these lesions the surgeon need not sacrifice sound bone as in former years. Without the guidance of the X-ray, the surgeon at times is obliged to make many unnecessary incisions in searching for the foci of the lesion. The traumatism that is thus caused may be the means of spreading the infection to previously uninfected regions.

With a skiagraph at hand, all this can be avoided, as the foci of the disease are clearly defined. Under the guidance of the X-ray, the sequestrum can be located, and their extraction accomplished with ease.

(To be continued.)

THE TREATMENT OF CHRONIC DISEASES BY
PHYSICAL THERAPEUTICS, THROUGH THE
SYMPATHETIC NERVOUS SYSTEM.*

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(Continued from page 570.)

The immediate as well as the remote effects of disease are two-fold: either the effect is hyperæmia or anæmia of the entire or only certain parts of the system. Hyperæmia may be, and most frequently is, co-existing with anæmia; that is to say, hyperæmia may exist in one part of the body, thereby causing anæmia in another. The direct as well as the remote effects of either one of these states are too well known to require further consideration here.

Hyperæmia must sooner or later bring about congestion, with its train of symptoms; or anæmia will cause atrophy and degeneration, the symptoms of which are also too well known, especially in spinal-cord diseases, to justify further elaboration in this connection.

Viewing diseases of all kinds, or their causes, within this narrow range of the four causes, and practically only two effects, our line of therapeutics becomes simple, and as simple as it may appear, it is also effective as well as scientific.

Similia similibus curantur. It is not within the scope of this paper to credit or discredit any one sect or particular school of practice, but the dogma advanced above certainly is entitled to more than mere consideration. What is more plausible than to attempt to correct the effects of microbic invasion with anti-toxines and antigerminicides, or the effects of harmful chemicals with antidotes, or the injuries from mechanical violence with or by mechanical means from active manipulation down to the application of scientific apparatus, splints, etc.; and, again, what is more logical than the art and practice of psychiatry in diseases of the mind?

One of the first principles in the practice of medicine is to remove, if still active, the cause. Frequently, however, the

* Read at the meeting of the Clinical Society of the New York School of Physical Therapeutics, June 19, 1903.

cause cannot be discovered, or if discovered, cannot be removed; we then must satisfy ourselves by treating the effects and assist nature in her noble effort to cure disease. As previously stated, the immediate effects usually resolve themselves into hyperæmia and anæmia locally or constitutionally. The words effects of the cause should not be mistaken for symptoms, for, as has been stated, we may have a long array of symptoms from these two effects.

Pain is usually one of the most common symptoms we are called upon to treat. As we have already seen, all nerves of motion and sensation at their entrance or exit to the spinal canal become closely allied with the sympathetic nervous system, and it is this system, whose office it is to take cognizance of the various sensations which it receives from all parts of the body, and after properly recording and interpreting the same, either in the sensorium or in its own reflex centers of the cord, to so govern the nutrition and blood supply of the parts from whence the painful impression proceeds in a manner best calculated to effect its abolition. It is, therefore, only when nature *fails* in her attempts, or when our measures are so directed that we *assist* in her efforts, that the physician plays the greatest rôle. This assistance which we would lend nature must, then, be through the same channels through which she would accomplish her purpose, namely—the sympathetic nervous system. No matter what portion or organ of our economy suffers, a reflex center is sure to be found somewhere in the spinal cord. Some of these centers are well known; others are more or less obscure. The sense of pain and sympathy, however, comes to our aid even here.

How to Find Painful Centers.—For this purpose, the patient's back is bared, a high tension faradic coil is brought into use. Before applying this current, the coil should be tested with a four- to six-inch Geissler tube. If the coil is capable of illuminating the tube, then it possesses the proper amount of penetrative power to be useful for our purpose. The Kidder Manufacturing Company of New York wind their coils in a new and novel manner, making them especially fit for diagnostic work.

One pole of the battery—it does not appear to make any difference which—is attached to a six by six inches moist electrode, and applied in front over the epigastric plexus, the other,

or smaller electrode, two by two inches, well moistened, is passed lightly over the spinal column, with a current strength sufficient to be agreeably susceptible. Pass this current up and down the entire length of the spinal column with ordinary pressure, eight to ten times, and remove the electrodes, when to our agreeable surprise we have boldly outlined upon an otherwise white background vivid *red spots*. These spots for some few minutes after the current is removed tend to become even more prominent and more sharply circumscribed. If we now make digital pressure upon any of these indicated points, we will find sensitive or painful areas, while no pain will be complained of in the intermediate region.

These pictures in a short time become almost pathognomonic of certain ailments, so that the observer can almost make a diagnosis from the reflex centers involved. The explanation of this phenomenon is neither mysterious nor difficult if we remember the nerve connection just prior to entrance or exit of the spinal canal; and if we bear in mind the effect of irritation upon any tissue, then we have a clear conception of why the sympathetic nervous system should respond so readily to our irritation, and why the more irritated centers (from other causes) should respond before even the normal tissue appreciates the irritation produced by the current.

Having by this, or any other manner or method, located the reflex centers involved, it next becomes our duty to ascertain whether the distal tissue or organ involved is in a hyperæmic or anæmic condition. Should we find that somewhere in the body an organ or tissue is swollen, and in a state of chronic congestion, our course would be to so influence the sympathetic center that the vascular supply would be limited. This can be accomplished by several methods: (1) by the application of cold water, icebags, or various evaporating lotions, or actual freezing with ethyl chloride; (2) by the galvanic current—since the passage of a weak current so stimulates these centers as to cause a contraction of blood-vessels supplying the part; (3) by the static brush discharge; (4) by mechanical vibration lightly and superficially applied; (5) by gentle massage applied to the tender spots; and (6) the application of the “light treatment,” especially the red rays.

If, on the other hand, we should find that we had to do with anæmia, it would require just the opposite treatment: (1) heat,

as hot water bags, counter-irritants, rubefacients, actual or galvanic cautery; (2) the passage of a current from a high tension faradic current; (3) static sparks, and the static wave current; (4) mechanical vibration with deep pressure and long stroke; (5) heavy massage applied deeply in the interspaces; (6) the application of the "light treatment," especially the blue or ultra violet. All these applications have the effect of causing the reflex centers governing the particular area to inhibit the vaso-motor nerves, and cause a dilation of the blood-vessels with increased supply of nutrient material. But, stop to ponder for one moment if in a given case of meningitis or myelitis, on the one hand, and spinal sclerosis or locomotor ataxia, on the other, where the pathology is exactly reversed, the treatment should be opposite to that which is indicated, the lesion would certainly get worse, the particular system of treatment be condemned and sink into oblivion without the operator perhaps ever knowing the reason for his failure, while from the other point of view, the operator produces glorious results, considers the particular treatment instituted a panacea, and becomes an enthusiast until he meets his Waterloo, perhaps never knowing why he succeeded nor why he failed. This clearly demonstrates the reason why the same remedy sometimes in some operator's hands succeeds when again with others nothing but dismal failure seems to be their reward.

A few practical cases will help to make clear the selection of the particular physical measure to be employed.

Case 1. Mrs. L., Hackensack, N. J. Age thirty-five. Family hist. neg. Always well until three years ago; contracted a cough; under treatment seemed to get better, but in short time cough reappeared; last winter was told she had chronic tuberculosis, could not live more than three months unless she went to Colorado. After a thorough examination, including X-rays, no tubercular lesion found, diagnosis: chronic bronchitis. Treatment: Static brush discharge for two weeks, gentle superficial vibration to tender spinal areas. Present condition: Feels absolutely well, no cough or expectoration for six weeks; gaining weight; appetite good.

2. Mrs. M., of New York; age thirty-eight; cough for two years, similar to No. 1, had to live in Washington, D. C., last winter; returned to her family early in the spring with the same harassing cough; put upon similar treatment, pain and cough

disappeared; sleeps and seats well; gaining in weight; has not coughed for four weeks.

3. Baby H., New York, sixteen months old; family hist. neg.; one child of a family of six; well up to the age of one year; then began to have convulsions; was treated with more or less success; convulsions returned; nothing seemed to influence them; had two to three daily. Last December examination revealed several tender spots along the spine with the muscles in a state of spasm and contraction. Treatment with the high tension current until the muscular spasm was relieved; then put on rather heavy vibration with long stroke, when convulsions disappeared in one week. Was discharged as cured in May, not having had a single attack in four months.

4. Elsie R., New York, age nine years; fell on the ice last winter, and shortly after developed chorea; gradually getting worse until the whole body was involved. Drugs had little if any effect. Spine very tender; muscles in hard, knotty bunches; was treated with high tension faradic, then put on coarse vibration with long stroke. In one week a marked improvement took place; in three weeks, or after the tenth treatment, all twitching ceased; has had no return now for six weeks; still under treatment.

5. Harry R., fourteen years; similar except as to cause, which is not known; had to remain home from school on account of twitchings; had been under medical treatment for six months with very little results; was put on deep vibration at once with long stroke; made immediate gains; is under medical treatment, however, with his physician at the same time; has had no twitchings now for two weeks.

6. Mrs. N., New York, age twenty-eight; one child; has peculiar delusions; desires to jump overboard, out of windows; feels like pulling her eyes out; rather plethoric; face and eyes suffused; no particular pain, but feels fullness of the head; menstruates regularly; tender spots at cervical region down to fourth dorsal. Treated with galvanic 5 ma. positive to forehead, negative to cervical and dorsal region, for two weeks. For the past two months, gentle vibration, short stroke, light pressure to effect contraction of Circle of Willis. For past two weeks feels very happy, has no delusions or peculiar thoughts; still under vibratory treatment.

7. Mr. W., Mt. Vernon, age forty years; stock broker; very

- nervous; can't sleep, but drowsy and tired during the day; cannot eat, on account of a nervous dyspepsia of some years' standing; always has to take cathartics. Examination discloses marked tenderness at first to third dorsal, and from fifth to eighth dorsal. Treatment: High tension faradic current to entire spine for five minutes; long stroke and deep vibration over tender points for four minutes. This was continued for one month. Then rectal vibration was added. At present time, eats and sleeps well, awakes refreshed; bowels still move rather sluggishly, but has not taken any drugs to assist for one month.

These cases are simply intended to show what can be done in chronic diseases, if we take the sympathetic system into consideration, and how to choose the particular method of treatment. Yet it must not be inferred that any particular one or all of these procedures could or should replace medicine or surgery. They are simply aids. It has been noticed that patients under drug treatment with their regular physician did better the moment these two systems were combined than with either alone.

A word should also be said regarding vibrators. The writer has tried about every known and conceivable form of apparatus, and is, therefore, in a position to speak intelligently upon this vital part.

There is to-day only one apparatus on the market that embodies the essential and necessary features, namely, rigidity and freedom from vibration, as far as the operator is concerned. A vibrator constructed upon the flexible shaft idea is absolutely inadequate, and has no place in a physician's office after one with a solid, rigid shaft has been tried. Neither has the writer been able to find a single so-called vibrating instrument that truly vibrated at all, for by the term "vibration" we understand a to and fro movement of a rapid order. Most of the flexible shaft vibrators are in reality "rotators." Still others are of the percussion type. The best so far as the writer's experience goes (extending somewhat over a period of twelve years), and the only instrument that has been brought up to date, is manufactured and sold by The Vibrator Instrument Company of Chattanooga, Tenn. It is in every respect a scientific, up-to-date instrument, capable of accomplishing *all* that is possible with vibration.

As far as the galvanic current is concerned, there is really no choice. Any good galvanic battery will answer the purpose. The main thing to bear in mind is the proper differentiation between the use of small and large currents. The error that is usually made is in trying to do too much with the cells in the office, and too little with the cells contained in the gray matter of the operator's brain.

THE VIS MEDICATRIX NATURÆ.*

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Mr. President and Members of the Clinical Society:

Within the reasonable limits of an ordinary paper it is manifestly impossible for one to do more than present a general outline of a subject so overshadowing and far-reaching as that chosen for this occasion. Without the least hyperbole of speech, it may be said that volumes might be written concerning the *vis medicatrix naturæ* without exhausting the subject. One may well be appalled, therefore, at the magnitude of the task of attempting to treat upon such a subject as this, even in the most desultory way, within the brief limits of the time of an ordinary evening session, and particularly so when only a fragment of the allotted time remains within which to do it. It should be clearly understood, then, that what it is proposed now to say in respect to this important subject, will be designedly general in character and must necessarily be somewhat dogmatic in the form of its statement.

Physicians need scarcely be reminded that what is meant by the phrase *vis medicatrix naturæ* is the power inherent and operative in the human organism that protects and repairs. It is, in other words, the quality that sets aright the errant function or organ of the human body when so-called "cure" is made. We have come to recognize it under another name—the "recuperative" or "reparatory" force of nature. Physicians of all creeds and sects concede the tendency of all acute diseases towards spontaneous recovery. They do not, however, as readily concede, if indeed at all, the same tendency in the processes of chronic diseases. Notwithstanding, it is believed to be equally true of all diseases irrespective of their nosology. The body, like everything else in the whole realm of nature, teems with the visible as well as the invisible evidences of the "provisions of nature." It is one of the distinctive and inherent qualities of life—especially of animal life. Observe its

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manifestation in the lower orders of animal life. If, for example, an eel chances to lose his tail, a new one sprouts out and supplies its place. The lobster losing his claw, is compensated with another quite as good. The horse changes his coat to meet the changing temperature of the recurring seasons.

A few illustrations of these "provisions" in the human body must suffice for our present purpose. Some weeks ago, I unconsciously attempted to prevent a door from closing with my right hand. It closed, however, but in the act of doing so, my thumb became engaged, and in a short time I observed an extravasation of blood at the bottom of the nail. There was very little pain at the time of the occurrence, and none a few hours afterwards. The nail didn't seem to me to be seriously injured. Evidently the *vis medicatrix* thought otherwise, for it has within the last few days presented me with a brand new nail, the old having been gradually cut away in its entirety. When the flesh has been injured, nature at once sets up its special process of healing by means of inflammation. In fracture, we observe that there is deposited along the broken fragments of the bone the natural cement which again unites the divided parts. The surgeon does not supply it. He only places the parts in proper apposition to receive the benefit of the natural healing process. A blood vessel is injured and blood commences to flow, but contemporaneous with it there is poured out the plastic lymph designed for the repair of the wound. In old age, as nutrition grows more feeble, the bones are wasted, thinned and softened. But the bones of the skull become thicker than normal, evidently to insure the greater safety of the brain even at the expense of the less important structures. In rickets, when the general organism does not get sufficient lime salts to build up a normal skeleton strength, nature endeavors to make compensation by the formation of bone at the growing lines, along the concavities of curves and at such other parts as transmit a greater proportion of weight. The idea of an "intelligence" that presides over the various functions and organs of the body, showing itself in the bones, for example, in distributing the available but insufficient lime salts to the most vital parts, finds no place, so far as I am aware, in the ordinary text-books on physiology. Nevertheless, this "selective" action of the organism forms no conceivable part of any property of matter, but is essentially

a psychic quality. In other words, this "intelligence," or "selective discretion" is nothing, in my belief, but the action upon the physical organism of the subconscious mind, or subjective consciousness, which will be considered more at length a little later in this discussion.

Professor Laycock has pointed out that if attention is daily directed to an opaque cornea during a hypnotic trance, a deposit of lymph is observed to form, and "that a structural defect tends to be removed by an act increasing the organic action of the part." In aortic obstruction and mitral insufficiency, nature endeavors to compensate by hypertrophying the left ventricle. A "solar plexus" blow is said to be rarely fatal *if it is expected*, the eye warning the mind of what is impending, and the abdominal walls are instantly made rigid *without conscious knowledge!* Observe the purposive manner in which the swarms of leucocytes work their way to the front, in all parts of the body, in their battle with bacteria! Who that has ever studied this interesting physical phenomena will doubt the existence of an intelligent, protective mechanism within the body operative at all times as the exigencies require, when we are asleep or awake, but always unconsciously as respects our objective minds? If all intelligence is lodged in the physical mind, from whence emanates this discretionary power when the brain is wrapped in slumber, or if awake, fails to cognize a morbid action or process? Dr. Clouston directed attention some time ago in the *British Medical Journal* to the fact that richly innervated tissue, like the skin of the finger pulps, is not so liable to cutaneous eruptions as the less endowed skin of the back and extremities. Dr. Mitchell Bruce, of Charing Cross Hospital, London, in speaking of the "safety-valve" action of the human organism, instanced as illustrations the relief of cardiac dilation and distension by relaxation of the arterial walls through depression of the circulation and of anorexia in gastric catarrh and hepatic disturbance, thus affording physiological rest; and again to the contracted kidney where increased arterial pressure favors freer diuresis and so empties the veins. It will thus be observed that the power acting in and controlling the body modifies the influence it may not be sufficiently powerful to overcome, and tries to remove the effects if it cannot reach and actually dislodge the cause. Hippocrates said: "Nature

is the physician of disease." Ambroise wrote on the walls of the Ecole de Médecine at Paris: "I dressed the wound and God healed it." But all this might be indefinitely multiplied if there were sufficient utility in the task to warrant the effort. Enough has been suggested already, however, to lend support to the propositions it is desired now to submit in postulate form, viz.:

That there is a force existent within the human body, at all times operative, that intelligently protects and directs the action of the various physical organs and their functions in contests, both defensive and offensive, for its protection, preservation and development, which in origin and quality is not physical but psychical. It is not controlled by but controls matter; and being of psychic quality cannot be perceived by the five physical senses nor cognized by the mind of the physical brain.

This, gentlemen, as I conceive it, is the meaning of the phrase *vis medicatrix naturæ*.

The inquiries that naturally suggest themselves at this point are:

- (1) *Where* does it reside; and
- (2) *How* does it operate?

Psychologists differ somewhat in respect to the nomenclature employed rather than as to the basic facts, and all of them recognize, with substantial unanimity, the plurality of consciousness. By some, the differentiation is made as the "voluntary" and "involuntary" mind, the "conscious" and "sub-conscious" self, the "supra" and "subliminal" consciousness, and the "objective" and "subjective" consciousness. Dr. Barrows, of Boston, divides them according to his belief in the anatomical location of their respective distributive forces, into "frontal" (cerebral) and "occipital" (cerebellular) consciousness. The precise verbal designation is, of course, of little consequence in the presence of the recognition of the fact of distinct and separate consciousness. For present convenience, let us speak of them as the "*objective*" and "*subjective*" consciousness, which is the classification of Hudson, Olston, Schofield and most of the other modern writers on psychology.

A moment ago, the inquiry was propounded as to *where* the *vis medicatrix naturæ* resided in the human body? Dr. Bar-

rows would place it in the cerebellum, but without sufficient proof, I think. That the *vis medicatrix* resides in the subjective consciousness and is part of its functions cannot, it seems to me, from a psychologic point of view, admit of a scintilla of doubt. *Where* that consciousness is located that works in and through and yet ever dominates matter, the combined wisdom of man's physical senses may never be able to determine. Is it any less real because it cannot be physically located? Who can locate the universal atmosphere? Does it appeal to any of the five physical senses? Nevertheless, our physical bodies cannot live a minute without it. Many men in the pride and greatness of their *physical* intellects doubt the existence of a soul. And yet, as we shall presently see, they could not live this physical life for a second without the soul's purposeful assistance and direction. No, the subjective consciousness being psychical, not physical, cannot be located exclusively in any particular area of the body. It, like the universal atmosphere, sunshine, light, radiant heat and energy, is immanent and omnipresent, controlling the respiration and circulation when our objective consciousness, or physical self, in the similitude of death, is lost in slumber.

How Does It Operate?—In my opinion, it is communicated through the physical body. The cerebro-spinal and sympathetic nervous systems are its special conduits, while the organism, as an entirety, is the conductor of the real life, which is *vis medicatrix*, but is not in any wise involved in its initiative. That belongs solely to the immaterial realm and part of our being. It is lodged in the *real* rather than the *apparent*, man.

We now reach, in my opinion, the most important phase involved in our consideration, where it becomes both desirable and essential to know the relations which our subjective sustains to our objective self. Liebault, long before Hudson, announced that the "Subjective mind is constantly amenable to control by suggestion," and predicated it upon the results observed in hypnotic subjects. Years afterwards, in his "Law of Psychic Phenomena," Hudson formulated his propositions concerning the subjective mind which have been since substantially adopted as a working basis by all psychologists. They are:

- (1) It is constantly amenable to control by suggestion from the objective mind;
- (2) It is incapable of inductive reasoning;
- (3) Its memory is potentially perfect; and
- (4) It has absolute control over all the organs and functions of the human body (meaning, of course, when not interfered with or otherwise controlled by suggestions from the objective mind to which it is constantly amenable).

Hudson proceeded to point out that perfect equilibration could only be maintained when the two minds operated synchronously, the one complementing the other. In order to insure bodily health and well being, each should attend to its own particular business, and *stick to it*. It is probably at this particular point that all the trouble originally began. Adam and Eve probably began making suggestions to their subjective minds, which being incapable of inductive reasoning, our alleged first parents imposed upon their psychic selves a lie concerning the traditional apple and its effects which finally culminated in their destruction and a lot of transmitted trouble for their descendants according to the belief still held by a good many otherwise sane and intelligent people!

But resuming the *serious* consideration of our subject, we may observe how, if let alone—not opposed by suggestions from the objective mind, which it is incapable of analyzing or discounting or correcting—the subjective mind, by virtue of its *vis medicatrix* quality, is capable, *under normal conditions*, of maintaining the body in perfect health. What are the *normal conditions*? Manifestly perfect reception and conduction of the impalpable current of life, a quality entering into the psychic composition, of which the *vis medicatrix* is, for our present purpose, the most important. When physical obstructions oppose its operation, its action is limited, and organs and functions suffer *pro tanto*. The physician comes in, and by the aid of certain physical agents (drugs or others), seeks to control and remove the obstruction. It is, then, a contest between forms of matter—the obstruction, and the agent employed for its removal. Suppose the physician succeeds and the physical obstacle is removed, making possible a re-establishment of *vis medicatrix*? The disease is cured! But who and what cured it? Was it the physician with his drugs or physical agents? I think decidedly not! The real cure could only be

made by the action of the *vis medicatrix* upon the abnormal condition. The physician, at the best and most, only "prepared the way." That was all he could do with his material means, and I devoutly wish he did it oftener than I believe he actually does. If what we have been considering be true, or even partially true, ought not the physician at least attempt to do more than merely prepare the way or remove obstructions? Ought he to be content with dealing everlastingly with only the physical expression of disease, without making an effort simultaneously to stimulate the *vis medicatrix* quality of the subjective self to greater activity?

But suppose he doesn't believe in the existence of the subjective self, because unable to have sensory knowledge of its doings through his objective self? What then? Perhaps he might be assisted towards a belief in *something* working within the human body that is highly essential to its existence and well being, but which is still extra-physical, by considering the following unchallengeable statement of fact? Measured by time, fully a third of every human existence is maintained independently of the physical senses or the sensory knowledge and will. Respiration, circulation, diapedesis, etc., do not slumber with the exhausted body while it sleeps. What is it that keeps a ceaseless vigil over these vital functions? From whence does it proceed? Why will digitalis, for example, sometimes sustain a flagging heart for a time, and then utterly fail to affect it? If some substances of extraneous matter are really superior to other forms of matter of which the human body is composed, why should it ever fail to subdue or otherwise control it? Once its superiority is admitted, the possibility of its failure ought to be eliminated from consideration.

But, leaving now this negative branch of the consideration, permit me to direct your attention to another and still more serious side of it. If we as physicians do not believe in the doctrine or the possibility of stimulation of the *vis medicatrix*, and are content to read our limitations of usefulness as we find them written in matter and the things of mere sense, we should inquire at least as to what our responsibilities affirmatively are in this matter? The subjective mind (of which the *vis* is a most important quality) is, as we have seen, "constantly amenable to suggestion from the objective mind." We have cut, sawed, and probed into the inanimate matter of the *post-*

mortem room, and brought the microscope and reagents to our aid in an endeavor to learn how errant physical matter behaves, and what its vagaries are. As a result, there has been accumulated a mass of pathological and morphological data perfectly bewildering to the student, and which it would require many months if not years, to even superficially read! Has the percentage of cures by physicians increased with our ever-recurring "finds" of new pathological lore? Obviously, that is what physicians are for rather than to trace the vagaries of errant matter *in matter*! After elaborate and lengthy pathological descriptions of many if not most of the newly classified diseases, are we not apt to find them dismissed with a few brief and hopeless words thrown in, apparently more as an after-thought, than for any anticipated utility—"treatment palliative only; cure impossible"? Nevertheless, nothing has been subject to greater change or fluctuation of opinion and belief than this much-vaunted (if not arrogant) science of the pathology of disease, about which so much is written, and which is so learnedly (?) discussed on the slightest provocation! With so many changes of base in the past respecting the pathology of many diseases, how can we ever feel "cock-sure" that our present classification is infallible?

If there were no help for the ailing organism save through such clumsy contrivances as modern pathology permits, what an indictment would justly lie against the Great Artificer of the bodies of men? Human beings would thus sink below the level of the lower animals, for they withdraw themselves when ill from the theater of their wonted activities, and alone and unaided by outside forces, regain their normal health and well being. But man, whom we are told was given "dominion over all things," seems, according to the belief of modern pathologists, to have lost nearly all power over the functions and organs of his own body, and become a helpless prey to the caprices of his physical environments. He thus becomes the merest plaything of contending physical forces. Nevertheless, we are told, and many of us believe, that "in God we live, move, and have our being." How can we believe this if we accept as infallible the dogmas and conclusions of modern pathology?

That these statements may not stand as wholly gratuitous and unsupported upon my part, permit me now to quote you

what Dr. Schofield, one of the ablest physicians of Great Britain, has to say in the year 1902, about the differentiation between *functional* and *chronic* disease. He says:

"We must remember that very much of our language is more expressive of our ignorance than of our knowledge. Most of our distinctions are due to the imperfections of our vision or to the limitation of our conceptions, and when very closely looked into, the difference between organic and function tends to disappear. As a matter of fact, we are brought to this, that no change in function can ever take place or does ever take place, without some corresponding physical alteration of structure. A great deal of our pathology consists of finely spun theories that do duty only until something more plausible comes along to take their place." This, gentlemen, let it be remembered, is the language of a physician of eminence and a scholar.

The practical question, gentlemen, is this. If there is even a doubt about the accuracy of our pathology, what right have we to communicate (either telepathically or otherwise) our gloomy prognosis, founded solely upon our perceptions in matter, to the subjective mind which "is constantly amenable to suggestion," and so inhibit its powers and the vitality—the *vis medicatrix*? The subjective mind cannot reason inductively or back from effects to cause and must, therefore, accept unquestioningly our erroneous beliefs as absolute fact, and act upon them to the injury of the organism. Say what we may about the doctrine of telepathy, personally I do not believe we can entertain in our minds a gloomy prognosis without communicating an impression of it, in some measure at least, to the subjective mind of our patient. And, what if we should be mistaken about it? Suppose our pathology is faulty if not actually incorrect? Does this not justify an urgent demand for greater faith on the part of the physician in the recuperative powers of the inherent, the resident life, the *vis medicatrix*—even in the face of what, from a material point of view, is discouraging or even hopeless?

If, as Prof. Schofield points out, we cannot always differentiate unerringly between functional and organic disease, how dare we presume to limit the beneficent possibilities of the subjective self on the human body? It passes current very well, now, for us to declare that no person really sick, or hopelessly

so as respects the possibilities of our *materia medica*, ever recovered through the ministrations of Christian or Mental Science, but most of us, deep down in our hearts, know better. While we know very well that these recoveries were not due to any virtue claimed to reside in these sham systems of healing, nevertheless, we know it cannot be gainsaid that scores of apparently hopelessly sick people—doomed to speedy death—have recovered their health, and had their lives saved through them.

When it is remembered that within the subjective self resides the force that can and does vitalize, and, if necessary, may—and actually does—rebuild anew every atom, molecule, and cell of the human body, it certainly is not within the competency of the most erudite of material scientists to say with accuracy *what* its present limitations are, if any, in respect to the cure of disease! We may know to a certainty how material conditions will likely respond to the interposition of certain material agents, but that furnishes no clew whatever to the possibilities of subjective force when unhampered and allowed to exert its energizing influence over the human body. Not so very long ago I saw a case of hypopyon involving fully a half of the anterior chamber of the eye. My material senses and knowledge as an ophthalmologist told me that without an immediate paracentesis, the eye would be inevitably lost. And so it was unless the *vis medicatrix* could stimulate the absorbent vessels to a super-material degree of absorption. Evidently, it did so, because the patient peremptorily refused all operative interference, affirming that his eye could and should recover without it! *And it did!* Two weeks later there was an absolutely clear and healthy anterior chamber. Will any gentleman explain this and similar cases that might be cited (for there are many of them, if only we permit ourselves to see them) upon any other theory than that of a successful appeal to the disenthralled and unfettered action of the *vis medicatrix*, which so powerfully stimulated absorption as to remove, unaided by surgical skill, the existing obstruction to cure?

In conclusion, gentlemen, permit me to say that in presenting this subject to you this evening, *it is not for the purpose of recommending the discontinuance of any material means used at the present time by the profession in the treatment of disease.* It is, rather, as a reminder that, while attempting to

remove the obstructions from the pathway to cure, we should not forget our privileges, if not our actual duty, in at the same time appealing, by the impartation of the necessary and proper psychic stimuli, to the *vis medicatrix*—the subjective self. If, for any reason, we are not disposed to attempt this, let us not, at all events, hamper it in its beneficent mission, by pessimistic suggestions proceeding from our material or objective minds the residual product of a system of pathology as shifting and changeable as the sands of the sea. Whether we believe in the possibility or potency of suggestions (telepathically conveyed by us to the subjective minds of our patients) or not, is it not wiser, in view of the momentous issues involved, to at least give ourselves the benefit of the doubt, and to so act as not to risk condemnation at the last before the bar of our own then more enlightened consciences, after all possibility for atonement may have passed from us forever?

Discussion.

Dr. Josephine G. Davis: I have thought for many years that physicians were prone to act as scavengers, and clear the way for nature to do the rest, and I for one am glad Dr. Pilgrim has had the courage to speak out loud what so many have been thinking "under their breath."

Dr. A. C. Geyser: The paper is beyond the scope of most physicians who are accustomed to deal with things material. No doubt a physician injures his patient by bad foreboding or a gloomy face. Many physicians, I am sure, are failures because they at once put on a wise and serious face on entering the sick room. It is better for the physician to visit his patient more as a friend would do. We can impart to the patient some of our own natures. In my paper I referred to a case in which a woman was told by her attending physician that she could not live over three months. This physician should not have told her this, even if he believed it to be true. There is much food for thought in this paper.

Dr. H. Grad: While the paper was being read I asked myself whether the author's suggestions could be put into practice. Just before coming here I received a message over the telephone, stating that a patient suffering from hydronephrosis had developed a high temperature, and it immediately occurred to me that it would be necessary to do an operation. Did I by this thought do my patient harm? Dr. Heckel, in his work, says that the unicellular organism represents the life history of a human being—in other words, in this single cell exist forces such as are found in the human being? If this cell were cut

across, it would heal over. The attempt to repair is present, then, even in the cell. This author speaks of the "cell-soul." In the more complex organisms, this function, which has existed in the single cell, is taken up by other parts, as for example, by the spinal cord and the brain. I would like to ask Dr. Pilgrim how this theory of Heckel's is to be reconciled with the views advanced in his paper?

Dr. Pilgrim: I will endeavor to answer Dr. Grad a little later in the discussion.

Dr. Snow: The paper is full of comfort, assurance, and optimism, and I do not think that I can add to or take from it. It is a very able paper, as Dr. Pilgrim's presentations always are, and I heartily congratulate him upon it.

Dr. A. F. Brown: If I correctly understand the paper, the author does not advise the discontinuance of any of the physical means at present employed in practice—drugs, electricity, etc.?

Dr. Pilgrim: That is quite correct. It is explicitly so stated in the closing paragraphs of my paper. It is not subtraction, but multiplication of the physicians' resources that is urged. My whole plea, if conceded, is constructive in its effects rather than destructive. Because I recognize a potentiality more effective than mere drugs or electricity, for example, does not lead me to deny the efficacy of those agents or to favor their disuse. I only decline to be bound by their admitted limitation in the processes of cure. That is all.

Dr. Bean: It has occurred to me that we must positively impress upon our patients that they will get well; but what if they refuse to accept our view, and still get well? I recall a recent case of obstinate intercostal neuralgia which I treated with the "wave current," but, although the patient finally admitted that she was relieved, she still insisted that she had no faith in this treatment. I saw her subsequently, and found that there had been no return of the neuralgia. What has the reader of the paper to say in reply to this point?

Dr. Pilgrim: I would say in reply to Dr. Bean that the objective mind does not always nor usually have sensory knowledge of what is taking place in the subjective mind. This point, so well recognized in psychology, cannot be too often emphasized. The doctor's patient, therefore, might say that she did not believe in the efficacy of the treatment and objectively believe it; nevertheless, deep down in her subjective consciousness—below the level of sensory consciousness—she may have believed in it. Because she *said* that she did not believe in the treatment, does not give warrant for assuming that in her subjective self, she did not possess the requisite faith or belief. It is not what a person says or believes *objectively*, but *subjectively*, that determines the issue of the battle.

I would reply to Dr. Grad's first point that if one operates with the full conviction that it is right and will cure the patient,

there cannot be any question about the propriety of doing so. It becomes not only "right" (to use the Doctor's phrase), but a duty. If, however, one proceeds to operate feeling, as it is feared surgeons often do, that the patient has a very slim chance, or no chance at all, that *attitude of thought*, not the operation, works a cruel wrong to the patient. It is not the operation; it is the lack of faith in the power within that works for cure, that does harm. We ought never to lose sight of the fact of that resident life and power within that is superior to physical law and all its limitations, which may be superimposed upon, but does not abrogate natural law.

As to Dr. Grad's second point, I do not pretend to be competent to satisfactorily answer every question that may very properly be raised in such a discussion as this. But I do not see in Prof. Heckel's assertion (if it be true) anything incompatible with the doctrine of *vis medicatrix*. On the contrary, it is corroborative testimony as to its verity. There must be in the "unicellular organism" the rudimentary or embryonic elements of the furthest possible evolutionary development. If *vis medicatrix* exists at all, why not in the primordial atom? If objective force is the result of evolution, it must have existed originally as a germinal quality in the primal cell. Therefore, the subjective, as well as the objective, quality of force must reside in the same cell precisely as they exist in the developed organism, and from this objective cellular quality emanates that inherent power which automatically repairs and heals. It seems to me that the developed human organism is at last only a multiplication or amplification of cellular life without any change in quality. In other words, whatever of change there may be, is quantitative, not qualitative.

I thank you, gentlemen, for your kind reception of my paper, and can only say, in conclusion, that if I had not a firm and abiding belief in the psychic force residing within the human body, and which lifts it out of and above the limitations of mere physical science, I would not attempt to practice medicine another hour. This does not mean, however, that medicines or other physical methods of treatment should be discarded. Not at all, although there was a long period in the history of the human race when there were no physicians. The world, apparently, got on very comfortably without them, and the average of longevity of the race was many times greater than it ever attained since it came under the tyranny of purely physical law. But the all-round physician ought not to ignore the physical any more than the metaphysical. It is for the recognition and operation of each in its proper sphere, that this paper is meant to contend and plead.

Editorial.

THE LATE DR. NEWMAN.

THE passing away of our confrère and associate editor, Dr. Robert Newman, has cast a gloom over the organizations with which he was intimately connected.

His gentle, faithful nature, true and attentive to all of the associations which claimed his fellowship, had endeared him to his friends. The intelligence of his demise is received by all with expressions of feeling and affection such as is accorded to none but those who have lived unselfish lives.

The cause of electro-therapeutics, which he has championed through the years when the medical profession in their ignorance scoffed, has been advanced by his efforts as by few others.

In his advocacy of what he had demonstrated to be true by a large experience, he was never offensive, and bore the gibes of those who were unwilling to thoroughly investigate his methods. He sympathized with them in their ignorance, but always energetically defended the truth. His last defense, which appeared in the September issue of the JOURNAL, is presented with a vigor and assurance which will live. The methods of Newman—the employment of mild, continuous currents, in the treatment of strictures of the open canals, will ever be known as *his* method, and his last professional appeal will be referred to as conclusive proof of his right to recognition.

* * *

THE FAILURE OF MEDICAL COLLEGES TO GIVE ADVANCED THERAPEUTIC MEASURES A DIGNIFIED PLACE IN THEIR CURRICULUM.

THE continued failure of the great medical colleges of the country to recognize in their courses of study measures which have already proved themselves invaluable in the treatment of diseased conditions calls, at this season of the year, for more than passing notice.

That these measures are justly termed *advanced therapeutic* measures is evidenced from the fact that the members of the profession who are above prejudice, and are broad-minded enough to investigate them, are employing them to-day. This is not stated in a spirit of censure, but of fairness, with an earnest hope that, instead of inciting prejudice, it may attract the attention of those who fail to recognize their value, and, at the same time call attention to a continued failure to adopt them in the regular medical teaching.

With those, who, from long experience, are familiar with the shortcomings of exclusive and generally empirical drug medication, there is always a growing disposition to diminish the number of drugs prescribed, and a tendency with conscientious physicians, who observe and study results, to give less and less of medicinal treatment. The members of the profession who employ in their later years, with the enthusiasm of their youth, the extensive list of remedies now accorded a place in the pharmacopœia, are those who fail to realize how valueless the majority of such remedies are. Furthermore, the disposition of the leading medical minds to make little use of the bulk of such remedies, and their inclination to rely less on medical measures, in the fullness of their experience, is sufficient argument that that sacred volume be renovated, and the useless drugs be stricken out, or at least relegated to their proper place.

How wrong it is to educate the rising physician to believe in that which in later years and experience he is certain to abandon! Failure to succeed in cases that, from their nature should be cured, with the measures taught in their college course, leads the mature physician to look out for more scientific and rational means than empirical drug medication with which to cure his patients.

Such physicians and surgeons are led either to adopt surgical measures which, on account of their certainty of action are more positive in their results or physical agents which may be studied in their effects from a more rational standpoint. When the medical man, however, comes to investigate the employment of electricity, hydrotherapy, dry hot air, light, mechanical vibration, or the Roentgen ray he requires a technical knowledge of the application of these agencies in order to obtain the most satisfactory results from their employ-

ment. We find many leading minds in the profession seeking with eagerness information in these departments of medical science. It is not the pharmacopile or the *hit-or-miss* doctor, who fails to discern the inefficiency of the ancient measures, that seeks this information, but the progressive up-to-date physician. The earnestness and eagerness with which he takes up and uses the measures above referred to, and the success which follows the introduction into his armamentarium of the means, are a guarantee of the certainty of their action.

We repeat again, "*opposition is the sign of ignorance.*" The man or teacher who opposes or stands in the way of the introduction of these measures into general use by the medical profession does so because he is unwilling to take the time to investigate it himself, and wishing, at the same time, to be considered in the van, would stigmatize the methods and cloak his own ignorance. False teaching or hypocrisy in matters affecting public health and the welfare of the community are inexcusable in an enlightened age, and deplorable when involving a learned profession.

The employment of electricity in therapeutics has grown apace with the better knowledge of the physical properties of the agent. When we look about us, and see the growth and employment of this form of energy in the commercial pursuits, and recall its use half a century ago, the progress is amazing. When we say that the employment of this same agent in therapeutics has advanced, in the hands of those who are familiar with it to an equal extent, our veracity is questioned, and yet, *it is the truth.* In the treatment of nervous diseases, electricity has made strides still unrecognized by many who are looked upon and consider themselves authorities. The success attending the treatment of neuritis (tabes, and anterior poliomyelitis in its early stages, when scientifically managed, are examples of the wonderful efficiency of the high potential currents. Local stasis, hyperæmia, congestion, and pain of acute and chronic inflammatory conditions are relieved by electricity, where the remedies of the pharmacopile have proved absolutely useless. Functional neuroses and debilitated states receive an impetus from the intelligent employment of this energizing force where drugs have absolutely failed.

The employment of electrolysis by the methods of Newman,

Massey, Gautier, and others has wrought successful results where surgical interference would have proved less effective.

Hydrotherapy has been recognized as a therapeutic measure since the earliest times, and yet few physicians to-day have a fair conception of its indications, and the technique of its employment. In what medical college has hydrotherapy been recognized? Probably no agency will, to the same extent, increase the physical resistance of the patient against climatic influences, and at the same time stimulate a healthy metabolism, as the scientific employment of water, one of the most common means at the command of physician and patient. The physician should ever be trained to intelligently advise his patient in the employment of hot and cold water baths, douches, wet packs, shower baths, sitz baths, and every other use of this valuable therapeutic agent.

The value of dry hot air, or heat generally, in the treatment of disease, has been acknowledged since early times, and yet what school teaches the methods of employment in a thoroughly technical manner? The Turkish bath has been employed generally under the supervision of laymen often unscientifically, and always fraught with elements of danger and discomfort. The body hot air treatment in skilled hands should supplant the Turkish bath, especially in the treatment of rheumatic and gouty affections. The use of dry hot air in a properly constructed body apparatus with the head of the patient not exposed to the heat, permits the employment of temperatures which promote profuse diaphoresis and active elimination to an extent not approached by the Turkish bath. This treatment, however, is not complete except when systematically employed in conjunction with hydrotherapy.

Mechanical vibration, employed in the form of massage, and under the title of osteopathy by a cult who have sought to make out of the employment of one measure a cure-all; performed manually in the past, has received a great impetus during recent years from the adoption of properly constructed apparatus. The great value of mechanical vibration as a therapeutic measure has been demonstrated clinically. It is applicable to inflammatory conditions, removing local stasis, infiltration, and congestions, stimulating nutrition, and improving local metabolism and secretion to a degree which was not possible

to accomplish with manual methods. Few medical schools in the country have given it a place in their curriculum.

The latest of the physical measures to receive recognition, and apparently the ones accorded a fairer treatment than those above referred to, are *light*, and the *Roentgen ray*. The rays of different degrees of refraction having been accorded special recognition already, owing to the labors of many advanced workers, receiving attention from all schools of medicine, but few, we believe, have added anything more than a passing consideration in the curriculum of the teaching of the medical colleges. It is probable that if the suggestions of many of the older masters regarding the value of light as a therapeutic agent, had been more generally recognized and employed, its adoption now would not be ranked as an advance in therapeutics.

The subject of *dietetics* has received indifferent consideration for years in the medical schools. Too few physicians to-day, from the medical training in their *alma mater*, are able intelligently to prescribe the diet indicated in the various conditions for which they are called upon to prescribe. If the same attention were given this all-important subject that is accorded the remedies of the pharmacopœia in the treatment of disease, there would be less call for the use of such remedies.

Physical therapeutic exercise, invaluable for the correction and prevention of deformities, for the induction of normal healthy metabolism, and the restoration to health of the indolent and inactive, is a subject which calls for most thorough attention in the medical colleges at this time, and what chair in the medical schools of the country devotes attention to this most valuable method of treatment? The ancient Greeks and Romans recognized its value, and the laymen to-day have adopted its use, in defiance, as it were, of a slow profession. The tendency, without medical advice, to a better observance of the laws of health, physical exercise, and diet, is a well-merited reproach upon the intelligence and progress of the learned profession.

Already, we hear much of *suggestion*, and much for and against hypnotism in the medical press, but what medical school in the country to-day is giving a scientific course in *psychiatry*? That it is important that such instruction should be given, there is little doubt, when all medical men recognize the value of suggestion, and employ placebos in treatment of disease. Placebos are dishonest. The rational intelligent employment of a cultivated personality in the physician, and its exercise for the benefit and well-being of the patient, in connection with the employment of physical agents, which act as a *vis a tergo*, will supplant in the future the placebo of the pharmacopile.

RESOLUTIONS ON THE DEATH OF ROBERT NEWMAN, M. D.

At a special meeting of the faculty of the New York School of Physical Therapeutics, held September 15, 1903, the following resolutions were adopted:

"*Whereas*, Time in his unswerving course, has removed from our midst an associate, knowledge of whom engendered not only respect for his honesty of purpose and indomitable courage of conviction, but personal affection because of the uniform kindly courtesy of his deportment; therefore, be it

"*Resolved*, That the sympathies and condolences of the members of the faculty of the New York School of Physical Therapeutics, be, and hereby are, extended to the bereaved family of the late Dr. Robert Newman, and that, in token of the esteem in which they hold his memory, the secretary be instructed to forward a copy of this resolution to his family, and for publication in the JOURNAL."

CLARENCE E. SKINNER,

President of the Faculty.

HERMAN GRAD,

Secretary of the Faculty.

WASHINGTON, D. C., September, 10, 1903.

DEAR DR. SNOW: I have just learned, through Dr. Skinner, of the death of our dear old mutual friend, Dr. Robert Newman. Words are inadequate to express my deep grief. We will miss him many times. He occupied a place in our affections greater than we realized, until he was taken from our midst, then the vacancy created by his death was all too apparent. He will live in our hearts; our memory will hold him sacred, and his work will live, as his everlasting monument.

Rest in peace, much beloved friend.

Yours very truly,

FRANCIS B. BISHOP, M. D.

THE THIRTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

As this issue of the JOURNAL goes to press the thirteenth annual meeting of the American Electro-Therapeutic Association is in session.

The long and attractive programme announced is an assurance that the meeting will be one of the most instructive in the history of the association, which is largely due to the efforts of our deceased friend, Dr. Robert Newman. He has well been recognized as the father of the association and his death at this time will cast a gloom over the otherwise joyous assemblage. His associates will there pay lasting tribute to his memory.

Progress in Physical Therapeutics.

GENITO-URINARY DISEASES.

EDITED BY ROBERT NEWMAN, M. D.

Report of a Successful Case of Decapsulation of the Kidney.

By James Tyson, M. D., and Chas. H. Frazier, M. D.,
Philadelphia, Association of American Physicians, May 14.

The nephritis was in the case of a child nine years old after scarlet fever, with extreme œdema of the extremities. Death seemed impending, and then the decortication of one kidney was performed. Ten days after the operation all the œdema and ascites had disappeared, and the patient was passing the normal quantity of urine. Two months following the first operation the second kidney was decorticated. Dr. Tyson, in closing, thought the operation much more suited to children, than to adults.

Gonorrheal Septicæmia; Its Occurrence and Course; Report at the End of one Year of a Case of Diffuse Gonococcus.

Infection of the Entire Upper Extremity. By Chas. A. Powers, Denver.

This is a report of one case, and the question arises whether the gonococcus in pure culture is producing pus or anything else. It is stated that the former diagnosis of gonorrheal rheumatism is a wrong nomenclature, as the disease arises from a toxic form, communicated by the gonococcus. In this case surgical treatment was necessary, and numerous incisions were followed by the exudation of a serous fluid, and once pus had been formed.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Vibratory Massage of the Eustachian Tube in Chronic Catarrh of the Middle Ear.

Vibratory massage is now considered a rational method of treatment in chronic catarrh of the middle ear. So conservative an aurist as Ernest Unbanschitsch (*Monatsschr. f. Chrenheilk.*, Journal of Eye, Ear, and Throat Diseases, No. 3) has introduced a new method for its application. This consists of

introducing a suitable bougie into the Eustachian tube, and then applying vibratory massage externally, which he does by placing the vibratode of a revolving motor to the region of the tragus, or the mastoid process, or to the upper part of the neck. He chooses the place which gives the greatest vibration to the bougie in the Eustachian tube. The strength of the vibrations depends upon the rapidity of the motor, and not upon its power. In unilateral middle ear catarrh a bougie is introduced into the tube on the affected side, and the external vibratory massage applied in the manner already given. In bilateral affections bougies are placed in both tubes, and the massage applied. This has the advantage of obtaining a greater effect, because the vibrations are felt, as a rule, in both tubes at the same time, though seldom to the same degree. It is noteworthy that the effect is often greater on the side opposite to that on which the vibratode is placed. The sittings last four minutes. The author does not inflate the tubes before or after the massage treatment, as he thinks patients do better without inflation. Improvement may take place after a few treatments, or after twenty, twenty-five, or even thirty sittings. The massage is applied at first three times a week, later it is daily. The author maintains that the reasons why we may look for good results in the vibratory massage of the Eustachian tube are the same which underlie the utility of massage in general, with its beneficial effect upon the muscular, vascular, and nervous systems. By way of illustration, the author cites thirteen cases which he has treated by this method, all of which had not been helped by other methods. Seven of the thirteen patients were cases of tinnitus. No mention was made of hearing. Five were cases with tinnitus and impairment of hearing. One was a case of neuralgia of the ear, with no mention of hearing or tinnitus. Of the seven cases of tinnitus with no mention of hearing, one was cured, three were much improved, and three were slightly improved. Of the five cases having tinnitus and impairment of hearing, four were improved, and one result was not given. The tinnitus was cured in two, and improved in three. The case of neuralgia was cured, but no mention was made of hearing or tinnitus. As to the permanency of the cures and improvements, it is too soon to say much, as it has only been a few months since most of the cases were treated.

Middle Ear Diseases in Tuberculosis.

In tuberculous subjects, the middle ear may become affected, either as a complication of the tuberculous condition, or the affection, in spite of the tuberculous condition of the patient, may be entirely independent of this. In reviewing this sub-

ject, Robert Levy, M. D. (Laryngoscope, May, 1903), summarizes as follows:

Any of the usual ear affections may affect the tuberculous, as well as the non-tuberculous. The usual modification of an acute otitis in a tubercular subject is manifested in the course the disease pursues. It is a doubtful question whether the bacillus tuberculosis is present as a distinctly etiological factor, or as an accident. Comparatively few cases of tuberculosis in children and relatively few instances of bone tuberculosis are met with in Colorado. Clinical tuberculous otitis occurs with moderate frequency in Colorado, being secondary to lesions of the respiratory organs. Tuberculous otitis may develop when the general symptoms of tuberculosis have been arrested, and the patients' condition unusually good. Tubercle bacilli may find their way into the middle ear through the Eustachian tube, through the lymph channels or the blood currents. Unusual care must be exercised in the application of the nasal douche in tuberculous patients. The discharge may be arrested, but not permanently as a rule. It must be exceedingly rare for miliary tuberculosis to develop from an otitis as the focus of infection. Through and through irrigation with tubercle bacilli destroying agents is of prime importance in the treatment. General and climatic treatment must be conscientiously carried out.

Serum Diagnosis of Tuberculosis.

The recent introduction of the serum diagnosis as a test of tuberculosis is now receiving considerable attention. That it does not form a reliable basis for diagnosis is shown by L. M. Loeb (Journal American Medical Association, May 23, 1903), who, from his own personal experience, and from the reports published by other observers, believes that, while, under various conditions, animal sera agglutinate homogeneous cultures of human tubercle bacilli in liquid media, still such sera may be obtained from the human or animal body without the presence in it of the bacillus tuberculosis. It is doubtful whether the agglutinative powers are ever due to the specific action of the bacillus tuberculosis, and therefore the presence or absence of tuberculous lesions in the body.

Ear Diseases in Children.

It is generally known that earache in children is almost always due to acute inflammation of the middle ear, suppurative or non-suppurative, but it is not so well understood that infants and young children may have suppuration of the middle ear without giving satisfactory evidency of pain, or without rupture of the drum membrane.

In an article entitled "Otitis Media" (American Practitioner and News; Laryngoscope, May, 1903), Hugh N. Leavell showed that otitis media is nearly always present in acute infectious diseases of the gastro-intestinal and respiratory tracts of young children, and probably stands in a causative relation to gastro-enteritis and broncho-pneumonia.

The cause of death in many acute and chronic infectious diseases, in meningitis, and in the exanthemata, is the result of unrecognized and untreated disease of the middle ear.

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Action of Electric Light Baths.

A. P. Rosen has studied the action of electric light and light heat-baths on healthy men. In the preliminary conclusions which he has published he notes the marked improvement of appetite and sleep that followed a series of twelve baths. There was also a gain of weight recorded after the light-heat baths. These favorable changes seemed to be lasting. The author mentions that in the blood reaction, there was now a numerical increase, now a diminution of the cells. A more thorough future exposition of the subject is promised.—Russky Vrtach, March 29, 1903.

The Present Status of Phototherapy.

F. H. Montgomery (Chicago), at the recent meeting of the Am. Dermatological Assn., presented a paper upon the above subject. He reported that in the Finsen Institute, of 800 cases treated by Finsen light, there was marked improvement in ninety per cent., with a cure of seventy per cent., and reappearance in twenty per cent. The recurrence was generally on a mucous membrane. Lupus erythematosus and epithelioma have been benefited in nearly all cases with a cure in one-third of them. In alopecia areata a good result was obtained in ninety per cent. of the cases. But a small per cent. was benefited in acne, as was also true in chronic eczema. In the author's own cases, one case of lupus erythematosus grew worse under treatment. The apparatus has been greatly improved, the light has been increased fourfold; the time and expense has been reduced one-half, to what it was in 1900. Among the many lamps in use, the London Hospital lamp is most widely in use; it is cheaper, and requires but fifteen minutes exposure, and an attendant is not necessary, thus reducing the cost. It is most

useful for small superficial lesions. In the deeper-seated lesions it is not so effective as the regular Finsen lamp. Some good results have been obtained in lupus vulgaris or other tuberculous affections of the face, but it is ineffective in ringworm.

The crusts should be removed by curette before the light is used.

Where old scars, thickening, or much pigment is present, the light treatment is not beneficial.

In the discussion which followed the presentation of this paper, Jackson pointed out the necessity of lenses of rock crystal. In two cases of lupus erythematosus he had used on one the London Hospital lamp, on the other iodine and quinine internally. The latter had given the best result. In three cases of lupus vulgaris with much thickening and cicatricial tissue, no results were obtained from the London Hospital lamp. In three cases of superficial epitheliomas, the result had been good. In one case there was entire disappearance from three applications.

Pusey thought the rays at the middle of the spectrum were most beneficial, while most observers thought the ultra violet rays were best. He found the best results in treating flat nævi from phototherapy. It is undoubtedly the safest.

Bronsen did not think the ultra violet rays, alone, were effective, as only one-third of the ultra violet rays penetrate the skin, while two-thirds of them are absorbed.

This is one reason why the original Finsen lamp is better than the later lamps, as it was constructed on the ultra violet plan almost entirely.

He regarded the use of adrenalin to produce ischæmia of benefit. Wende reported that he had used red light in the treatment of both erysipelas and measles without good result.—*Am. Med.*, June 20, 1903.

Radium.

A man sixty-one years of age, who had been repeatedly operated upon for cancer of the palate and lip, but with no benefit, was recently submitted to the action of radium, at the clinic of the late Professor Gussenbauer, and the case reported to the Viennese Society of the Imperial Academy of Science. Further operation had been declared useless. The parts were exposed to the rays of radium bromide. The tumors gradually and completely disappeared. Another physician reported a case of melanosarcoma also cured by the same medium.—*N. Y. Med. and Phil. Med. Journal*, Aug. 15, 1903.

Correction.

In the September issue of the *JOURNAL*, the cut of the lamp for gynecological work, which appeared in connection with the

abstract of Makaveyeff's article on a photo speculum, was incorrectly placed, and should have appeared in connection with the remark of the editor of the department, as it was a cut of the lamp devised and used by the writer ten years since.—
Editor Dept. Phototherapy.

THERMOTHERAPY.

EDITED BY CLARENCE EDWARD SKINNER, M. D., LL. D.

The Institutional Treatment of Rheumatism, and Other Chronic Diseases by Means of Dry Hot Air, Electricity, etc., by R. M. Sterrett, M. D., Providence, R. I.—The Alkaloidal Clinic, August, 1903.

After discussing the general relations of dry hot air with other therapeutical measures, the writer mentions reasons why this agent has many times failed to give satisfaction, the most prominent being that "it has been used indiscriminately in certain pathological conditions where its physiologic action is not indicated, but in many more instances to the lack of proper technique on the part of the operator, and the employment of unscientific, cheap apparatus," all of which we heartily endorse.

Referring to the greater facilities for progress enjoyed by the surgical as contrasted with the "medical" elements of therapeutics, he says, "That the surgical side of the profession has largely monopolized the established hospitals and charitable institutions will scarcely be questioned, nor that the special facilities thus obtained have perfected the art and skill of the operating surgeon. Far be it from the desire of the writer to detract in any way from the glory of modern surgery, or even if in his power to deprive this branch of the profession any facility for advancement; but that therapeutics other than along surgical lines should advance in due proportion, and in such proportion as to render the knife many times unnecessary, some form of institutional facilities should be recognized and encouraged by the profession as they are by the laity who, for want of such facilities under the care of the regular, honorable, educated physician, are led to try the so-called medical institutions, owned and operated solely for gain by unprincipled quacks."

Massey, in his work on "Conservative Gynecology and Electro-Therapeutics," devotes a chapter to this subject. He says: "Special institutions, thoroughly adapted to particular lines of work, are therefore a most necessary adjunct to modern medical progress, and the author looks forward to the time

when their value will be as well appreciated by the profession in all chronic affections as the modern hospital is appreciated as a means for good surgery. That the people for whose benefit they will be created, already understand the value of institutional treatment, is shown by the success of institutions now well patronized by them, some of which were established by uneducated persons."

Dr. Sterrett then describes the apparatus that he uses, and discussess succinctly the physiological action of dry hot air, which may be summarized as follows:

Local treatment; relief of circulatory stasis; increased blood supply to the part treated; increase in the nutritive processes of the part, due to reflex stimulation of the trophic nerve centers; the withdrawal of a large amount of fluid from the part treated through the perspiration induced; and an increase in the temperature of the part treated, whereby chemical reactions are facilitated, and an inhibitive influence upon the development of any pathogenic micro-organisms that may be present, is secured.

Body treatment: first, an immediate and powerful stimulation of the vital physical signs; second, a reflex stimulation of the function of all the organs and tissues of the body, resulting in, first, a degree of elimination which is unequaled by that produced by any other measure now known, and, second, an amount of reconstructive activity which also at the present time, would seem to be in excess of that derivable from the use of other agents.

A popular fallacy concerning the use of dry hot air is thus disposed of, "In considering the high temperature used, patients may conclude there is danger attached to this form of treatment, but there need be no cause for any fear. The reason is that absolutely dry heat can be borne safely and with comfort at high degrees, while moist heat would scald and blister at low degrees. And, moreover, dry air at exalted temperatures, being more intense, accomplishes vastly more than ordinary vapor, steam, Turkish, or Russian baths, or even the Hot Springs."

The article contains six half-tone plates illustrating apparatus and technique, and is a valuable contribution to the literature of the subject.

Disinfection by Dry Heat.

Schumburg (*Zeitschrift für Hygiene und Infektionskrankheiten*) shows that, although dry hot air is so uncertain in its action as to be unsuitable for practicable disinfection, air at 100° C., will kill the most resistant non-sporing bacteria in and on clothing and other objects within an hour, if it contains from

fifty-five to sixty-five per cent. relative humidity. This degree of moisture can be obtained by having a vessel of water in the space where the objects are treated. Since disinfection of clothing and other objects containing anthrax and tetanus spores is very seldom needed, and since, on the other hand, the bacteria most commonly the object of disinfection (those of typhoid fever, cholera, plague, influenza, diphtheria, tuberculosis, and probably measles and scarlet fever, and the pus cocci) form no spores, disinfection with moist hot air will suffice in almost all cases. This method has this advantage over disinfection by steam: that articles of leather (gloves, books, riding breeches, etc.) may be exposed from six to eight hours without injury.—American Journal of the Medical Sciences.

Superheated Medicated Air in Diseases of the Ear and Throat.

By Joseph C. Beck, M. D., Chicago—The Laryngoscope, May, 1903.

Beck has devised for the therapeutical application of medicated, dry hot air to the external auditory canal, an apparatus "which consists of a metal cylinder mounted on a handle. The tip of this metal cylinder is mounted by a wood fiber canula, two inches in length, which is detachable. Within this cylinder is an incandescent lamp, which carries a current of 115 volts, supplied with a switch at the handle to turn off or on the current by simple compression. At the back of this cylinder is an opening into which is inserted the nozzle of the compressed air tube. The medicator is within the cylinder. It is a small metal box, containing a piece of felt, which is saturated with the desired medicament, and it acts at the same time as a filter for the air.

"As soon as the electric current is turned on, the metal cylinder begins to get hot, and within a minute or two it has acquired a sufficient heat to warm the air which passes through it from the air tubule. As soon as the current of air is allowed to pass through the heated chamber, it will come out in a concentrated warm stream from the tip of the wood fiber canula. It requires about two minutes to produce a very hot current, but the temperature can be regulated by the switch. The pressure of air can also be regulated by the cut-off on the air tubes."

For medicating the hot air formalin in forty per cent. solutions, menthol full strength, and chloroform, strength of solution not stated, have given him the best results.

He reports twenty-three cases of otitis media catarrhalis chronica in which the deafness and tinnitus were not relieved. In three of these patients the tinnitus was increased; four cases of acute otitis media (earache) in children, in which

all pain was relieved after one or two applications, the cases going to recovery by tympanic perforation; two cases of otitis externa furunculosa relieved of pain after a five-minute application, and going on to recovery after incision; three cases of acute sinusitis without suppuration very much relieved by the treatment; and one case of lupus affecting the right ala nasæ, which was cured by eleven application of super-heated air after six weeks' treatment with X-rays had failed to produce benefit. In cases of acute inflammation of the Eustachian tube, and weeping eczema, the results obtained are characterized as most gratifying.

Dr. Beck speaks very hopefully of the prospects of the method proving useful in chronic suppuration of the middle ear, and divides these cases into two groups for purposes of prognosis; those in which the bone has been involved in the disease processes, as shown by the presence of bone dust, cholesterolin, and cholesteatoma cells in the centrifuged sediment of washings from the middle ear cavity; and those in which the bone is not affected. His experience has shown that in the former class the prognosis is not favorable, but in the latter the outlook for cure is very promising. Even with cases belonging in the first class, the results obtained by this method of treatment were far superior to those following the use of the older methods. He considers that the method produces the effects in this disease predominantly by reason of the following:

"1. It stimulates suppuration, and helps to throw off pathological processes, thereby producing a healthy surface of healing. It produces epidermization more rapidly.

"2. The cavity is dried, and produces a poor culture nidus for bacterial development.

"3. The formalin in this gaseous state is forced into all crevices, and exerts its germicidal action more efficiently."

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Hydrotheraphy in Typhoid Fever. Frank L. Adams, Pacific Medical Journal, June, 1902.

This is one of the most excellent articles published in some time. The writer quotes Baruch as saying that "hydrotherapy includes the application of water in any form from the solid and fluid to vapor, from ice to steam internally and externally." His conclusion is that the consensus of opinion among the best medical writers and clinicians of the present time is that "the cold bath is the safest, best, and most suc-

cessful mode of treatment that we have in typhoid fever, and this method should be strictly followed if we wish to obtain the same good results that hundreds of observers have obtained in both private and hospital practice." It is interesting to note from Baruch's statistics, which he publishes, that immediately after the Civil War the mortality was 49 per cent. and later treatment, without baths, it ranged from 32 to 16 per cent. Brand, the originator of the bath, collected 11,124 cases taking expectant treatment, showing a mortality of 21.7 per cent. Of 19,000 cases collected by him treated by all kinds of cold baths, mortality 7.8 per cent. Of 5573 cases from German and French sources more thoroughly and systematically treated, mortality 3.9 per cent. Of 2198 cases strict Brand cold water, mortality 1.7 per cent. Of 1223 cases treated by Brand, Vogl, Jurgensen, and others, mortality 1 per cent. Brand reports 2150 cases treated before the fifth day, mortality none. Borning and Barker, private practice, 128 cases strict bath, mortality none. The writer remarks that it has been said with some justice that you can prove anything by figures, but from a comparison of the tabulated reports one could make a conservative estimate that six times as many lives are saved by cold baths as are saved under the older methods of treatment. Strumpell says there is at present no other single method of treating typhoid fever which has showed such numerous and evident advantages to the patient. Dr. Gillman Thompson describes his experience while being treated by the Brand method for typhoid: "It is not agreeable at any time to be taken out of a warm bed and suddenly immersed in cold water, but the after effect is so soothing and the favorable influence upon all the symptoms is so pronounced that the temporary discomfort is easily endured." The technique of the bath is simple, but must be adhered to religiously. The patient is given a cup of hot broth and stripped. The face is quickly sponged in ice water and the patient is then gently lifted by two assistants and lowered into the tub. Under no circumstances should he walk; every part of the body except the abdomen should now be vigorously chafed and rubbed. Rubbing along the spine and back of the neck will often relieve the feeling of cold and shivering. If there be decided chattering of the teeth or cyanosis of the face the bath should be discontinued at once. After the patient has been in the bath ten or fifteen minutes he is removed to the bed prepared in the following manner. A double blanket is placed over the bed and over a pillow which is covered with a double thickness of crash toweling; over the blanket is spread a linen sheet and at the foot of the bed several hot water bottles are placed. The patient is lifted into and wrapped with the sheet in such a manner that the arms and legs do not come in

contact with wet surfaces. The blanket is then thoroughly wrapped over the entire body. The objections he mentions to the bath are the following: (1) Labor and expense. (2) Conservatism and prejudice on the part of the profession. (3) Opposition of the public, which it is our duty to overcome. (4) Harshness and cruelty of the bath are urged by those who are too weak-kneed to practice it, and this sentimental condition should not stand in the way of the patient's recovery. (5) That physicians modify and follow out imperfectly the bath. (6) Shock that the patient suffers; this is false, as the chief advantage of the bath is that it is a stimulant to the heart, improves the circulation, and acts on the vital centers. (7) Danger of cold and lung trouble. This is a fallacy, as one of the main objects of the bath is to overcome the tendency to congestion of the lungs and attendant pulmonary complications. (8) It has been charged that more cases relapse after this method; there are no statistics bearing upon this point. Baruch observes, however, that this is probably true, as there are so many more survivors to relapse. Beneficial effects of the bath: (1) The blood is cooled at the surface by direct absorption of heat and the cooled blood acts as a tonic on the heart, thus improving the circulation and cooling the brain, which induces sleep. (2) It improves the general nervous symptoms, as delirium, stupor, mental dullness, muscular twitching, tremors, and causes sleep. (3) It strengthens the action of the heart by direct stimulation of the heart nerve centers and by improving the peripheral circulation. (4) Through improved enervation and circulation all the digestive functions are improved. (5) It improves respiration and lessens the tendency to bronchitis and pneumonia.

SOCIETY MEETING.

Stated Meeting, June 19, 1903.

JAMES A. MITCHELL, M. D., IN THE CHAIR.

A Paper on the Treatment of Chronic Diseases by Physical Therapeutics Through the Sympathetic Nervous System.
By Dr. Albert C. Geyser.

Discussion.

Dr. William Benham Snow: I have listened to the paper with great interest, for the author's method of considering it is unique. I have given a good deal of attention to the treat-

ment of chronic diseases by the physical methods, and, therefore, appreciate fully the action of the sympathetic nervous system, and its relation to the vasomotor system. I have realized, also, the value of vibration in overcoming what I have long learned to consider the greatest obstacle to recovery from chronic inflammatory conditions, *i. e.*, stasis. To my mind, local stasis is the greatest bar to recovery from inflammatory troubles, and whatever will restore to the local circulatory apparatus its normal tone, produce a normal flow of the blood, and stimulate the processes of an active metabolism, will prove valuable, and is indicated.

The vibratory influence is one which produces an onward flow, and if the agency applied is such that, without causing any alterative changes in the structures or any destructive processes while it produces tone and normal circulation, it will certainly bring about a normal condition.

The author's explanation of the method of diagnosing the various centers of irritation in the spine by means of high tension coils is new to me, and I shall take pleasure in giving it a trial. During the past year my attention has been especially directed to the relation of the sympathetic system to diseased conditions, and I am free to say that this study has opened up a new field to me. The relation alluded to is undoubtedly a marked and important one, and in the treatment of cases by mechanical vibration, or by static electricity, the recognition of this principle will, I feel sure, give us a better and more intimate knowledge of the sympathetic system in its relation to disease.

During the past year I have seen a case of asthma, occurring in a young man who was in every other way healthy. Every damp day he had paroxysms of asthma. He has been cured by mechanical vibration. This case presented painful centers over the region of the cord corresponding in distribution with those of the lungs. As these painful centers disappeared the asthmatic attacks ceased. It is now four months since he has had a paroxysm in spite of the damp weather. I am disposed to believe that vibration, whether derived from mechanical apparatus, the static modalities, light, the X-ray, or other means, must now be recognized as important therapeutic agents.

Dr. Josephine G. Davis: I wish to congratulate Dr. Geyser on his excellent paper; it is *multum in parvo*. I am much

pleased with this idea of mechanical, chemical, and physical treatment.

Dr. Lucy Hall-Brown: I have been very deeply interested in this scientific, and in some respects, original paper, and have been more than repaid for coming here. I am very glad the paper has been presented to the society. I can only corroborate what has been said by both Dr. Geyser and Dr. Snow with regard to vibration. It is a subject in which I am intensely interested, and we all know that there is a great deal yet to be learned.

Dr. Herman Grad: I have had no personal experience with vibration further than the observation of a few cases treated by it. The therapeutic results are undoubted, although how they are brought about I do not know. It is quite possible that Dr. Snow is right in the supposition that the results are largely due to the removal of stasis, but personally I am inclined to think that there is more than stasis, that there is a round cell infiltration. Probably in the cases presenting areas of hardened muscle, there is an exudation into the muscle sheath, and in this way the circulation is disturbed. There has been at this school a case of goiter, which has been very decidedly reduced in size simply by the application of vibration to the spinal centers. That the circulation of an organ can be so powerfully influenced by stimulation of these centers is worthy of our most thoughtful consideration. Asthma is probably nothing more than a disturbance in the vasomotor system, and the same is probably true of chorea. It is interesting to know that such conditions can be relieved by vibration when they cannot be relieved by medicinal means.

Mr. Brown: I should like Dr. Geyser to state the size and material of the electrodes employed by him; also whether the redness of the areas referred to is well marked.

Dr. Stern: I have been interested in vibration for a long time, and, like the reader of the paper, I have investigated the various forms of vibrators, and prefer the same one that he does. No mention was made in the paper of a fact which I have observed, *i. e.*, the contraction of the spinal muscles. Frequently the muscles of both sides of the spine will be found firmly contracted. It is apparently a muscular contraction, and not a round-cell infiltration, because oftentimes continued pressure and the application of the vibrator over these areas

will cause a disappearance of the contraction. We all know that every time one is in any position except prone the muscles of the body are busy automatically in holding the body properly balanced, and that the muscles of the spine are more especially engaged in this automatic work. This throwing of the muscles of the spine into the automatic sphere causes them to react more to stimuli than those which are constantly under the influence of the will. For instance, you get a stiff neck from exposure to a cold draught more quickly than you would get a painful contraction of the muscles of the arm. In intestinal disorders there are oftentimes painful contractions of the muscles in the dorsal region. A very interesting case came under my observation not long ago, that of a woman who had sprained her knee very badly. She was laid up a long time with it, and on going around again she suffered a good deal from pain in the other sciatic nerve. She also complained a good deal of pain in the back of the shoulder on the opposite side. On examination, I found the muscles on that side markedly wasted, and those on the opposite side contracted as far as the second dorsal vertebra, and it was opposite this point that the pain was complained of. I applied a vibrator to the contracted muscles, beginning at the second dorsal, and carrying it down to the lowest lumbar vertebra, and then across and down the sciatic nerve to the side affected. One treatment was sufficient to relieve all of these reflex troubles. Another interesting case was that of a gentleman between sixty and seventy years of age, who complained only of a stiffness of the muscles of the body, and loss of flesh. He came in with great difficulty, and the muscles of the spine and neck were firmly contracted. I could find no other symptom except a wasting of the muscles. He ate well and the bodily functions were working well. By relaxing these contracted muscles the greatest possible change has taken place in this man in the course of three weeks. He is again stout, and can get around very much better. There was in this case a slow starvation of the muscles of the spine, causing reflexly a lack of blood in all the internal organs.

Dr. James A. Mitchell: I feel that the paper of the evening strikes at the very root of the subject. I have found it possible to reduce congestion by means of positive galvanism in very mild doses, *i. e.*, 10 or 15 ma., applied for four or five minutes.

The congestion does not always disappear immediately, but in the course of two or three treatments it is surprising how much the congestion is reduced. In cases of subacute inflammation and stasis one can, by the use of positive electricity, relieve this stasis.

I have found that the negative pole of the galvanic current will produce a red spot on the surface with from 5 to 15 ma. of current, and that this will last for two to three days, whereas with positive galvanism these spots will not be so marked, and will disappear in a few hours. I recall one woman in particular who complained of pain in the back near the posterior spinous processes of the ileum. I applied 3 ma. of current to this spot with the negative electrode, and found it unbearable. She could stand 10 or 12 ma. of positive electricity. Two or three days later I made use of the primary current of the faradic machine, and to my surprise she tolerated a current of considerable strength. After applying this for a few minutes I returned to negative galvanism, but found she could stand only about 3 ma. After a second application of the faradic current, however, I was able to make use of 18 ma. of negative galvanism, and by this means she was quickly and permanently relieved. In this case the uterus was large and congested, but in three treatments it became of normal size, and was in its normal position.

I have treated a few cases of beginning mastitis in an early stage, when there was a tender and painful mass with a few streaks or tender lines radiating from it. By the application of from 8 to 15 ma. of positive galvanism for five minutes, the patient experienced prompt relief, and in a few treatments the case was, as a rule, completely cured, and no abscess developed.

With regard to the contracted muscles, I would say that in such cases I make use of the negative galvanic current to bring the blood back into the muscles, and almost invariably this gives relief.

Dr. Geyser: I did not mean, in my paper, to limit the use of the word "vibration" to the use of a mechanical vibrating instrument. I have long held that everything depends upon vibration, be this the application of the X-ray, light treatment, or of the application of any other means of vibration. Every living cell must possess a certain normal rate of vibration, when from any cause this rate is disturbed, as we have discords in music so do we have disease in the living cell, should this normal rate be increased, we would have the manifestations of increased tissue metamorphosis, while if entirely lost, we would have death of that tissue.

Dr. Grad spoke of hardened conditions in the muscles. I claim that no muscle becomes hardened of itself—that it is always reflex. There is nothing that can be put into a muscle which will cause the fibers to contract of themselves; it must

occur through the reflex system. The contraction of the capillaries will cause contraction, and will cause the extrusion of mucus, thus causing hardening of the muscles. In appendicitis the surgeon will almost make the diagnosis on finding a hardened or rigid muscle. I do not think there is any round-cell infiltration, except as a secondary and rather accidental effect.

In answer to Mr. Brown's question, I would say that the electrodes used are 4x6-inch pads, covered with chamois or cotton, applied to the abdominal surface. The other electrode is made of metal, and is covered with moistened cotton. I referred to a case of convulsions having hard and knotted muscles in the back. Dr. Stern was right in saying that these masses will relax, and that they become hard through reflex and vasomotor interference. The red spots produced by the galvanic current should not be confused with the red spots I spoke of. Such spots can be produced in any part of the body, but if, with the same current, you go up and down the spine you will find a long streak. It is a very different matter with the high tension current. A current must be used which will not contract the muscle fibers; it must be a current having sufficient tension to illuminate a 4- or 6-inch Geissler tube. When such a current is applied up and down the spine for a few minutes, if there are any spots capable of being irritated they will appear as distinct spots on one or the other side of the spine. You will notice either an elevation or a depression, depending upon whether or not there is atrophy. In either case there will be a red spot, and in this there is usually found the center. A lung trouble will always show a certain spot; uterine disease will always show a certain spot; a spot at the fourth dorsal on the right side is always observed in cases of spasmodic obstruction of the pylorus. In such cases there will be regurgitation of food a few hours after eating.

BOOK REVIEWS.

THE A B C OF PHOTO-MICROGRAPHY. A Practical Handbook for Beginners
By W. H. WALMSLEY, F. R. M. S., F. A. A. S. 155 pages, 5x7, with
29 photo-micrographs by the author. Cloth, \$1.25 net. Tennant and
Ward, New York.

This neat little volume supplies a long-felt want for beginners in photo-micrography. It considers the microscope and optical apparatus, the camera, and photographic appliances, the radiant and illumination, negative-making, printing methods, lantern slides, and general notes relative to storing negatives, varnishing negatives, intensification, and points of great importance for fine technical work.

The plates are exceedingly fine, and the arrangement and contents should recommend the work to all microscopists.

ORGANIC NERVOUS DISEASES. By M. ALLEN STARR, M. D., Ph. D., LL. D., Professor of Diseases of the Mind and Nervous Diseases, College of Physicians and Surgeons, Medical Department of Columbia University in the City of New York; Consulting Neurologist in the Presbyterian St. Vincent's Hospitals, St. Mary's Free Hospital for Children, and the New York Ear and Eye Infirmary; ex-President of the American Neurological Association, The New York Neurological Society; Vice-President of the New York Academy of Medicine; Corresponding Member of the Société, de Neurologie de Paris; Author of "Familiar Forms of Nervous Diseases," "Brain Surgery," and "Atlas of Nerve Cells." Illustrated with 275 engravings in the text and 26 plates in colors and monochrome. Published by Lea Brothers & Co., New York and Philadelphia, 1903. Price, 50 cents net.

This valuable contribution to the subject of neurology represents the results of twenty years' experience and study in the practice of one of the most able authorities upon the subject, and one who has a right, as an authority, to assert himself. No work on nervous diseases to the present time is embellished with so practical and finely executed plates, drawings, and half-tones as this volume.

While the writer gives credit to other authorities, there is very much contained in this work which shows original research and investigation. The plates showing an ophthalmoscopic picture of the normal retina and the early and later stages of optic neuritis, as well as of the relative appearance in optic nerve atrophy, are examples both of professional and artistic skill. The numerous cuts, plates, and illustrations, showing pathological changes add greatly to the value of the work. It is a text-book which should be owned by every student and practitioner. The author and publisher are to be congratulated upon the excellence in every feature of the work.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

LINSTROM'S X-RAY SCREEN.

As it is now an established fact that the X-ray will burn the patient as well as the operator, if exposed too long to the X-rays, it is necessary that every user of the X-ray machine should use an X-ray screen.

The cut below illustrates a screen, which is very simple, and which can be attached to any good tube-holder. As can be seen



from the illustration, the tube is connected to the screen, and the screen is held by an ordinary tube holder, which enables the operator to adjust it the same way as a tube.

The opening for the rays can be adjusted to any size and many dozen different shapes can be obtained, besides protecting the patient and operator from X-ray burns. It will also protect the tubes from breakage.

THE R. F. REGULATING UNIVERSAL TUBE.

Figure 1 represents the R. F. Tube, manufactured by R. Friedlander & Co., of Chicago, Ill., and places before the profession an ideal tube for all classes of X-ray work.

The tube is blown from the finest Thuringian glass, which offers the least resistance to the ray, and which allows none of

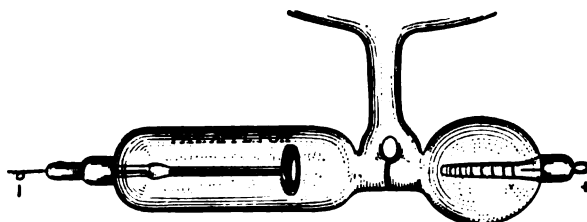


Fig. 1.

the rays to be withheld within the tube; the tips are thoroughly annealed and rigidly fastened, thereby overcoming the possibility of dropping off after a few weeks' use; the anode is suspended by a loop in the stem instead of a direct wire, which

prevents the anode breaking off from jar or from its own weight; the heavy platinum disk of the anode is of sufficient thickness to withstand all the bombardment that can be given without injury; the regulating device, on which patents have recently been granted in the United States and Germany, enables the operator to have perfect control of the vacuum of the tube at all times. The appearance of the tube suggests mechanical ability and is beautifully finished.

The manner for the adjustment of the vacuum is fully illustrated in Figure No. 2. A glass partition separates the compartments A and C so that the regulating devices work inde-

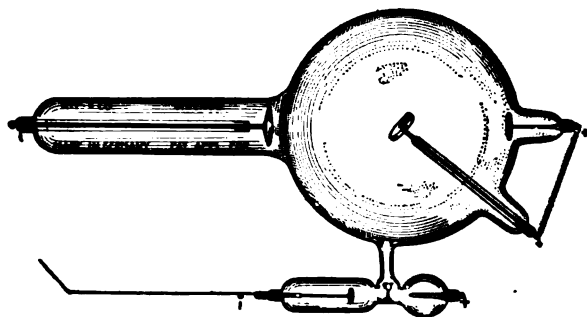


Fig. 2.

pendently of each other, and are not in any way influenced, one with the other, during the adjustment.

To lower the vacuum of the tube attach the cathode-conducting cord of the main tube to the auxiliary cathode C, turn on the current carefully, and within two seconds the desired result will have been obtained. To raise the vacuum of the tube, attach the anode-conducting cord of the main tube to auxiliary anode A, turn on the current from five to ten minutes, or until the desired vacuum is obtained. In either case, after regulating, connect as usual with the anode or cathode of the main tube. With this tube, the operator has at his command accurate and reliable means for raising or lowering the vacuum which is absolutely essential where general use of the X-ray is desired.

A low-vacuum tube is required for treatment of lupus, epithelioma, acne, and all superficial diseases, a medium tube for cancerous growths, sarcomas, etc., and a high-vacuum tube for radiographing the pelvis and denser structures of the body, and the treatment of deep-seated lesions.

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SOME PRINCIPLES ON WHICH IS BASED THE THERAPEUTICS OF ELECTRICITY IN NERVOUS DISEASES.*

BY A. D. ROCKWELL, A. M., M. D., NEW YORK.

It will, I think, be admitted that the methods of treatment most efficient in diseases of the nervous system, whether functional or organic, are not to be found among the drugs of the pharmacopœia.

Physical methods, combined with climate and diet, are beginning to be regarded as the essentials not only in the cure but in the prevention of many diseases.

It is what we eat and drink, and the way we live in the pursuits of business and pleasure that constitute the determining factors of sickness and health.

Now, why is it that so many are disappointed in the results obtained from the use of physical methods of treatment, and especially electricity, in those cases where, according to well-established principles, the treatment ought to be efficacious. The reasons, broadly speaking, are three in number.

1. Ignorance of the physics and physiology of the method employed.

2. Imperfect technique.

3. Failure to appreciate the differential indications for the use of the various modalities.

One may possess a thorough knowledge of physics, but if his technique is faulty, this knowledge will not avail.

His technique may be perfect, but if he has no power of differentiation, the results will be unsatisfactory.

To clearly appreciate the differential indications for the use

* Read before the Annual Meeting of the American Electro-Therapeutic Association at Atlantic City, N. J.

of the different electric modalities is at once the most difficult as it is the most neglected part of the art of electro-therapeutics, and it will be my aim in the following considerations to make clear some of the principles involved. I am the more impelled to do this, because of an increasing tendency to boom the new at the expense of what is good in the old. The value of static electricity and high frequency currents is well established, but they are not the whole of electro-therapy, and he who confines his efforts to these modalities will in many cases widely miss the mark.

Theoretically and according to the teachings of electrophysiology, when with the galvanic current it is desired to diminish a local nervous excitability, as in cases of neuralgia and spasmodic conditions, it is proper to apply the anode on the sensitive part, thus producing a condition of anelectonosis.

To produce a contrary effect, to increase the excitability, the cathode is locally applied.

While this is a long-established principle in physiological experiment on the exposed nerve, it does not hold to the same extent in therapeutic work. In the use of the galvanic current the positive pole will be found in general to be more sedative in its effects than the negative, but the latter frequently relieves pain quite as readily as the positive.

Sometimes it is more effective.

This is seen in cases of so-called neuralgia, which upon closer examination are found to be not cases of true neuralgia at all, but conditions of what may be called pseudo-neuralgia.

In such cases the pain spreads over certain areas, running seemingly in the direction of certain nerves very unlike the true neuralgia, so graphically described long ago by Anstie.

In true neuralgia the pain accurately locates the course of the affected nerve and pressure invariably increases the distress. In pseudo-neuralgia firm pressure will not only cause no pain, but not infrequently affords decided relief. In these cases the local application of the cathode is to be preferred to that of the anode. Not only this, but the induced current itself is peculiarly effective in such cases, and will give relief when the continuous utterly fails. But there is another reason, and one perhaps that will be more readily appreciated, why electricity relieves pain. It does it through its influence

over the vasomotor activity. All pain is necessarily due to nerve pressure, and by exciting the activity of the circulation through congested areas—inducing indeed a sort of circulatory drainage—the disappearance of pain is often coincident with relief of pressure. It acts very much on the principle of the application of heat, the difference being that its effects are more far-reaching as evidenced, for example, by its influence over the pain of deep-seated malignant growths.

For the relief of spasmodic conditions, combined electrization, or galvano-faradization, is vastly superior to other methods of electrization. On the contrary, it does not relieve pain as readily as either of the currents alone, of which it is composed, and is also inferior for this purpose to the electric modalities of higher tension. As to why it fails to relieve pain, it is not perhaps very difficult to conjecture. The continuous current, like its fellow the induced in this combination, becomes subject to a break in the continuity of its flow, and so fails to induce that condition of anelectrotonus essential to sedation. Why it acts so much more efficiently in spasmodic conditions is not so easy to determine, since its lack of power of sedation would seem at first thought to render it quite as useless as an antispasmodic as it is as an analgesic. It must be remembered however that contraction of muscular fiber, whether voluntary or involuntary, is the outcome of the combined activities of different nerve centers.

Certain parts, when stimulated, excite muscular contractions; other parts tend to arrest or inhibit movement, and their combined action, when normal, results in a healthy physiological activity.

Muscular spasms, then, may result, as readily from defective inhibitory action as from an excessive excitability of motor nerve centers, and in the treatment of various spasmodic symptoms by internal medication this principle is recognized.

To lessen the irritability of the motor centers the bromides are given, to stimulate the inhibitory centers alcohol is administered.

It is on this principle, we believe, that combined electrization acts. It should be and probably is useless in those cases of spasmodic movement dependent upon excessive excitability of the motor centers, acting in those cases only that

call for stimulation, namely, where there is a deficient action of the inhibitory centers.

Turning to another phase of the subject, let us seek an explanation for the very positive benefits so often obtained through physical and psychical methods in such functional nervous diseases as neurasthenia and those conditions of mental disturbance that have not yet crossed the border line separating them from actual insanity. We must, it seems to me, for want of better explanation, refer these results to the action of these forms of energy on the nerve units of the body. There is no more fascinating field of research than that relating to the minute anatomy of the nervous system, and the concept of the neuron as a functional unit affords a basis for a rational explanation of the effects on nerve force, of physical and psychical forces.

To appreciate the significance of this statement, one has to accept the theory that the nerve units termed neurons are made up of multifarious prolongations, and are in association with each other by contiguity rather than by continuity, as well as that other theory of amoebic movements. By amoebic movements are meant the power of the neuron, under pressure, to expand and contract by means of its protoplasmic prolongations, by which connections between neuron and neuron are alternately made and broken. On this theory we can no longer consider the nervous system as a permanently continuous chain along which the nervous waves course, like the waves of electric energy over its wire connections, but a path which is liable to offer obstacles to the flow of the nerve current, through many causes. If the causes are grossly organic or structural we may get a permanent amnesia, an incurable hemiplegia or perhaps insanity; if they stop short of demonstrable change of structure, the paralysis will be slight and transient, and instead of a permanent amnesia, the forgetfulness will be of short duration. Inertia of the neuron and consequent disarrangement of its protoplasmic connections through shock, dissipation of any kind, or through the stress and strain of long-continued emotional causes, constitute undoubtedly the causative factors of many a pronounced case of neurasthenia. If a man is hereditarily weak, if he has been endowed with a nervous system so unstable that he is unequal to the ordinary activities of life, all unusual

strain, whether of work or dissipation, is bound to interrupt the normal flow of nerve impulses, and to more or less permanently impair the connections between neuron and neuron. His chances for relief therefore are inferior to that of those who possess a nervous system hereditarily strong, but which has in the same way been damaged by excess of any kind.

How does electricity act upon the neuron? Is its action almost entirely psychical, as some have claimed, or does it possess a very positive and direct physical action upon the amoebic movements of the neuron body?

The psychical and the physical are so intimately connected that it is often difficult to dissociate them. Physical disease and even structural changes are often as much the result primarily of psychic processes as of an actual physical traumatism. Conversely, functional derangements of an organ and sometimes even organic diseases are benefited by purely psychical as well as by physical therapeutics. If electricity acted only as a purveyor of suggestion, its well-known influence in that direction would entitle it to respectful attention. Its range, however, is far wider than this. In its physical aspect we have only to consider its mechanical, chemical, cataphoric and electrotonic action, all of which are mathematically demonstrable, to see how much more important are its physical than its psychical influences.

On the neuron the influence of all high frequency currents, and of what is termed vibratory therapeutics must in the main be mechanical or electrotonic. Changes are produced in the excitability of the neuron. New connections develop from out the protoplasmic prolongations, opening up new paths of conduction for the transmission of the nerve waves, the obstruction of which give rise to so many symptoms of disease.

Nerve force and electricity have long been regarded as entirely distinct the one from the other, but some interesting arguments have been recently advanced in support of their identity.* It is held that laboratory experiments respecting the speed of nerve impulses are crude and inexact and not to be relied upon. That, indeed, this speed is much greater than generally believed. This statement as to the greater rapidity of nerve force is based on experiments made

* *Journal American Med. Association*, March 7, 1903, J. Emmet O'Brien.

on telegraphers as to the maximum rapidity of muscular contractions. These muscular contractions are found to be much more rapid than the speed commonly attributed to nerve impulses, while the usual speed of electricity is found to be much less than its supposed maximum velocity.

Whatever truth there may be in these suggestions, the analogy between the transmission of the nervous wave and the electric wave is of the most striking character.

This is seen in the details of wireless telegraphy, with which you are all familiar.

The coherer, which is simply a tube of iron filings—each particle of iron being separate and distinct, the connection between them being by contiguity rather than by continuity—is absolutely non-conducting to a weak current. Subject it, however, to the influence of electric vibratory waves, and it becomes immediately a conductor and transmits our message. In some such way, it is believed, the nervous system reacts to external influences. In the functionally diseased neurons there is a loss both of contiguity and continuity. Nerve impulses are arrested in their course, resulting in what are termed functional neuroses, in hysteria, in hysterical anæsthesia or paraplegia, in impaired memory and confusion of ideas.

The powerful influence of strong emotional excitation in dissipating certain functional nervous symptoms has long been recognized. It is believed that these purely emotional neuro-motor excitations accomplish these therapeutic results by overcoming the non-conductibility of the resistant neuron. In the same way, it seems rational to believe that when a patient is placed within a field of influence of currents of high frequency, or is subjected to such influences as central galvanization, or the static wave current, the resultant effect over sensory, motor and mental symptoms is due to the power of these electric impulses to so reinvigorate the potential energy of the cell life as to open up new paths for the transmission of the nervous current. It is immaterial that the electric impulses that set in motion and regulate the wheels of industry be transmitted by any special route. The essential thing is the fact of their transmission. It is the same with nervous impulses. If new connections can be formed by the action of any physical or psychical force to take the place of those broken by disease, it matters not so long as they are sufficient to transmit the natural nerve force, upon the free transmission of which depends the perfection of every mental and bodily activity.

**PRESIDENTIAL ADDRESS DELIVERED AT THE
THIRTEENTH ANNUAL CONVENTION OF THE
AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION,
HELD AT HOTEL WINDSOR, ATLANTIC
CITY, N. J., SEPTEMBER 22, 1903,**

BY DANIEL R. BROWER, A. M., M. D., LL. D.

Fellows:—Joys and sorrows, sunshine and cloud are constantly present with us in this life. This convention so full of joyous anticipation meets under a heavy cloud of sorrow, Dr. Robert Newman, to whose unselfish devotion and earnest energy the social comforts and scientific possibilities of this meeting are mainly due, has gone hence, to his reward and rest from his labors. Another has been appointed to present to you some of his achievements, but I cannot begin this work without paying a passing tribute to him, the Nestor of this Society, who has in season and out of season, always labored for the advancement of its scientific work and the general success of its meetings. As Chairman of the Executive Committee, he has been the propelling power that has never permitted its best interests to stand still. At least twenty letters have been received by me from him telling of the things he had done and making valuable suggestions that it was a pleasure to endorse, all tending to the successful issue of this meeting. *Requiescat in pace.*

I congratulate you on this the Thirteenth Annual Convention of our Society upon the attractiveness of the scientific programme gathered together by our efficient Secretary. The forty odd topics therein contained, presented every one by a master mind furnish matter for discussion and pabulum that will nourish the electrical territories of our cerebrums for a long time to come.

I congratulate the Society on the unusual active interest in the profession and out of it, in electro-therapeutics. There are at least two dozen establishments manufacturing appliances for the medical use of electricity, where there was one when this association was organized, and there are many excellent schools for post-graduate work in electricity where there were none at that time. A general practitioner who then might have had an inferior induction coil battery in his

office, now has at least a static machine, and one will not be surprised to see a wall plate for controlling, for medical purposes, the commercial current, giving him a continuous or an alternating electro-motive force. The same very greatly increased interest is manifested by the numerous excellent books on the subject that have been published in the last few years. This Society has just contributed two thoroughly practical and eminently scientific books, one on Static Electricity by the chairman of our standing committee on Static Machines, Dr. Wm. Benham Snow and a new edition of that classical work by our distinguished member, Dr. A. D. Rockwell.

Progress is manifested in the great activities of kindred societies in other countries that have made possible International Congresses of Electro-therapeutics, and at this meeting our lamented fellow, Dr. Robert Newman, was to give us a retrospect of the Second International Congress at Berne. While we thus can see evidences on every hand of the rapid onward march of this great healing agent, yet I cannot but regret that there is not a wider diffusion of the knowledge that is bound up in this and other affiliated organizations, as I see every day on the part of otherwise well-educated physicians a most deplorable ignorance of the fundamental principles upon which this science rests. I was in the office of a successful practitioner in my city not long ago and saw in his office a well-appearing medical outfit, and to my questions if he used electricity much, he answered, yes, but only for a possible psychic effect. Think of it: this agent that carries our messages around the world with the rapidity of lightning, only psychic. The agent which can transport us with the rapidity of the winds, only psychic; this agent that can destroy life and can with ease resolve the structures of the body into their original elements, only psychic. My friend, the doctor, knows but little of the mechanics of his batteries, nothing of the physics of the powerful agent, nothing of its physiology, and but little of its therapeutics. The beautifully constructed appliance with its hundred cells did not produce a current strength of one-half milliampere with my body in the circuit and I told him that a battery in such working condition could not produce anything but a psychic effect.

It is a common experience with me to have patients to whom I have suggested the use of electricity tell me that they have tried it and it was of no use; their physicians had told them to get a battery and use it; everyone his own electrician is as wise as everyone his own lawyer. A toy faradic battery probably furnished electro-motive force, and an unscientific application of the electrode did the rest, and worse than failure the consequence.

How can we disseminate among the general practitioners the wealth of knowledge we possess for the benefit of the public generally? The members of this society are experts. At their annual convention we give and take wisdom, and push on the advancement in mechanical appliances, in technique and therapeutic uses, and are justly entitled to the credit of the present advanced position of the science generally. It is our bounden duty to scatter broadcast its benign influence so that all may reap its benefits. The unfortunate invalid who lives at the cross-road perchance must remain a sufferer all his life because he cannot avail himself of its healing powers. His physician, well skilled in the other departments of the profession, knows but little of the mechanics, physiology, and therapy of the various electric currents. His education in the medical college was almost, if not absolutely, nil. The volumes in which have been recorded the transactions of the society are to him a sealed book and the JOURNAL that now publishes our proceedings does not reach him. Time will not permit him to attend our meetings if he does justice to his County and State Societies and to the American Medical Association as is his bounden duty. To reach him then we must go to him and for this purpose, the society should be in close affiliation with the American Medical Association, holding its meetings at the same time and place.

A proposition having for its object the initiation of a movement towards such an affiliation, has been received by me as your President, from Dr. J. M. McCormick, the Representative on organization of the American Medical Association in such courteous tones as to demand our most earnest attention. If affiliation with this most representative body of the profession does not meet with favor, then I suggest that a similar union with the Congress of American Physicians and Sur-

geons be considered, and our meeting be held every three years at Washington City with this distinguished body. Either process I believe would result in crowding our sessions with general practitioners, anxious to avail themselves of this great opportunity.

I suggest to the Society that the time has come when we should drop from our nomenclature the terms galvanism, faradism, and franklinism, and substitute for them scientific terms that will be endorsed by our confrères, the Electrical Engineers. I think we have sufficiently honored the memories of Galvani, Faraday, and Franklin and can now with propriety, put ourselves en rapport with our distinguished associates. The committee appointed by the society to investigate the nature of the currents used in medicine, of which Mr. W. J. Jenks is chairman, reported to the association, September 4, 1902, and the report was published in the *JOURNAL OF ADVANCED THERAPEUTICS*, January, 1903. The members of the committee ask a "general and intelligent criticism and suggestion." I trust it may be your pleasure to accede to their request and thereby further the very important work of rendering our medical nomenclature scientific.

An unusually large number of candidates for membership will be submitted to you at this session. I urge you to carefully guard the portals. Commercialism has severely damaged the course of Electro-therapy and we should condemn it in all its aspects with emphasis. The rule that the fundamentals requisite for a resident of the United States, those required by the American Medical Association, should be rigidly enforced. All who seek to unite with us, should have membership in good standing in their County and State Societies and in the American Medical Association.



RADIUM: WITH A PRELIMINARY NOTE ON RADIUM RAYS IN THE TREATMENT OF CANCER.*

BY MARGARET A. CLEAVES, M. D., NEW YORK.

Not only the scientific world, but the lay as well, listens with bated breath to the marvelous tales told of radium; tales which, especially when accompanied by demonstrations of the apparently magical phenomena of this new element, seem more befitting fairy lore than abstruse scientific fact; and one can but wonder whether radium may not prove a veritable Aladdin's lamp to medical science as well as to physics.

"All nature is vibrating, from the lowest musical note to the highest pitch of the chemical rays," and in radium the highest form of etheric vibration is to be found.

The electro-therapeutist with his high frequency discharges from vacuum tubes, his ultra-violet rays, his cathode and X-ray must of necessity have not only a scientific but a practical interest as well in radio-activity.

Radium, polonium, uranium, actinium, and thorium, form a group of radio-active metals which have been extensively experimented with and studied by Professors Becquerel, Thompson, Rutherford, Crookes, Lodge, Laborde, and Professor and Madame Curie.

With radium, polonium, actinium, and thorium, light is given off the moment they are created, without having to be stimulated by any form of heat, light, electricity or any other form of energy so far as is at present known.

A vast amount of speculation and some interesting hypotheses have been evolved to explain the phenomena observed in experimenting with these substances. "It is believed that from them much will be learned about the constitution of matter and the correlation of the vital and physical forces, more in all probability, than any substances which have been created since the world began."

Following upon the investigations into the phenomena produced on the interior and exterior of various kinds of vacuum tubes to which great importance must be attached, came the discovery in 1896 of M. Henri Becquerel of the radiations emanating from uranium and which are known as Becquerel

* Read at the Thirteenth Annual Meeting of the American Electro-Therapeutic Association, Atlantic City, September 24, 1903.

rays. A vast array of well-known names is associated with investigations into vacuum tube phenomena, names which are veritable household words to the physicist, among whom may be mentioned Varley, Hittorf, Crookes, Lenard, Roentgen, Hertz, J. J. Thomson, Goldstein, Schmidt, Ebert, Weichert, Geissler, Kauffman, Puluj, Perrin, Villard, Wien, Weidemann, Majorama, Birkland, Deslandres, Poincaré, Edison, Tesla, Rowland, Michelson, E. Thomson, Moore, Rollins, and Campbell-Swinton.

To Becquerel, however, the science of radio-activity owes its foundations.

In 1898 Prof. Pierre Curie and Mme. Sklodowska Curie, when investigating the radiations from uranium discovered by Becquerel, found that some samples of pitchblende or uraninite, from which uranium is extracted, gave forth radiations much more powerful than any uranium they had found, having four times the activity of metallic uranium.

Painstaking research resulted in the discovery of a substance associated with bismuth and resembling it very much in its chemical characteristics. To this substance Madame Curie gave the name of Polonium, in honor of Poland, the land of her nativity.

Polonium is to be had in the form of a metal and in the form of a subnitrate. The metallic polonium resembles particles of nickel and the sub-nitrate is a white powder. The only specimen of metallic polonium in this country is in possession of Mr. W. J. Hammer from whose exhaustive and interesting monograph * on radium many facts set forth herein have been gleaned. He also has the sub-nitrate and both specimens possess an activity of 300. Just here it may be well to state that the radio-activity of uranium is taken as a standard of comparison and polonium of 300 radio-activity or radium of 7000 radio-activity, means that the one is 300 and the other 7000 times more powerful than the original radiations emanating from uranium or Becquerel's rays.

In the same year, 1898, Professor and Madame Curie isolated a second substance from pitchblende, which was associated with barium and possessed many chemical and other

* Radium, Selenium, Ultra Violet Light, etc., Wm. J. Hammer. D. Van Nostrand & Company, N. Y. A lecture delivered at the meeting of the American Institute of Electrical Engineers and the American Electro-Chemical Society, New York, April 17, 1903.

characteristics of that substance. To this they gave the name of Radium. In 1899 Debierne discovered actinium.

Radium, actinium, and polonium have a million times the activity of uranium according to Professor Curie.

Gietel finds that polonium has both deviable and non-deviable rays and Elster states that when it is placed in a vacuum it is found to be deviable by a magnet to a much greater extent than radium. The rays from actinium are also deviable, while the rays from radium are reflected from a



Fig. 1.—RADIOGRAPH OF A STEEL TOOL.



Fig. 2.—RADIOGRAPH OF MOUSE.

straight line, differing in that respect from the Roentgen or X-ray.

Professor Curie regards radium as distinctly a new metal; it has never been found however in a metallic form, but is to be had as a chloride or bromide.

Radium bromide is the strongest radium salt yet produced, and there is but little of it in existence, the amount having been estimated at as little as four grams. All radium of higher radio activity than 7000 has until recently been retained for the experiments of Professor and Madame Curie and their associates, but recently information was received from Director Boulay of the Société Centrale, that they expected shortly to put upon the market a preparation of radium,

chemically pure or nearly so at a cost of \$6000 per gramme. It is estimated by Professor Curie that the three years' work done both in Germany and in France had, a few months ago, resulted in the production of but one pound of radium, including all grades and qualities. There has been no radium on the market in this country until very recently save the German radium, which Professor Curie has never found to have more than 300 radio-activity. Recently, however, Eimer and Amend of New York have imported from the Société Centrale, the French radium prepared in the laboratories of Professor and Madame Curie, of both 3000 and 7000 radio-activity, in sealed glass tubes containing a decigram each.

The radiations of radium have the power to penetrate opaque solids as does the X-ray. It has been demonstrated, however, by the work of Becquerel, the Curies, Rutherford and others that there are three distinct types of rays emanating from radium, known as the α , β , and γ rays. In the first instance it was pointed out by Rutherford that uranium possessed two distinct types of rays, α and β , the former easily absorbed even by gases, whilst the latter are very penetrating but little absorbed by gas. In radium the α rays constitute the major proportion, are by far the most important class and are the most active in the ionization of the gas which has been observed under experimental conditions. They are the rays which possess certain characteristics of the Roentgen or X-rays and in a strong electrical field 45 per cent. of them have been deflected by Rutherford. They are readily absorbed and a thin screen of metal suffices to cut off the most of them. Hammer shows among a considerable number of radiographs, one of a steel tool made by radium in twenty-four hours, acting through two thick X-ray plate envelopes, of a mouse, made in twenty-four hours by laying it directly on the plate and of a mouse in a trap, exposed for three days. In the latter the wooden part of the trap is transparent as with the X-ray. He also photographed a dead human hand, exposing it for eight days. A slight trace of the bones can be seen. It is supposed to be the first picture of the human hand made with radium. Through Mr. Hammer's courtesy I am enabled to show these radiographs.

Rutherford estimates that the energy of the α rays is a thousand times greater than that of the β rays and is also

authority for the statement, that all radio-active substances, including polonium, as well as excitable bodies and their emanations give out α rays.

The rays are much longer, have greater penetrative power, are readily deflected by a magnet and correspond in every particular to the cathode rays.

With them electrified bodies are discharged by ionization of the air, photographic plates affected, etc. These rays are

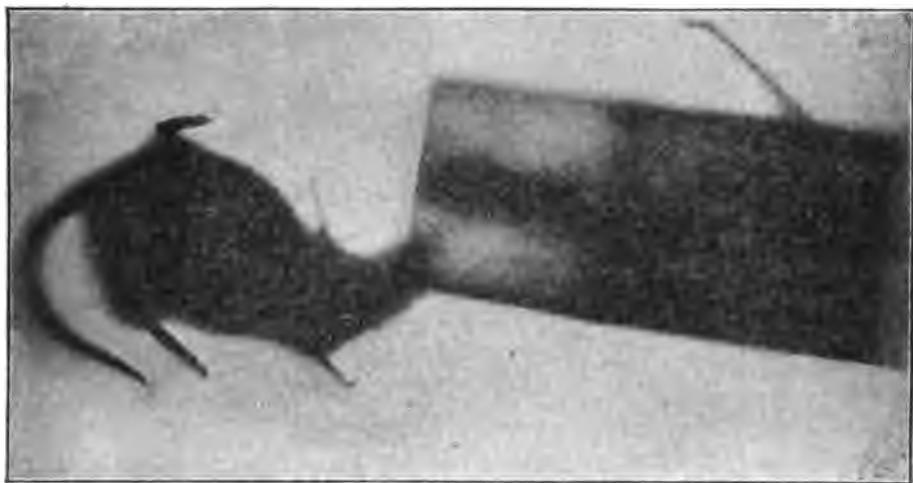


Fig. 3.—RADIOGRAPH OF MOUSE IN A TRAP.

projected from the cathode at a speed approximating 70,000 miles per second. They were proven by Villard in 1899 to be negatively electrified corpuscles or fragments of atomic hydrogen. These "corpuscles" so named by J. J. Thomson are shown by him to be the one-thousandth of the mass of a hydrogen atom. The γ rays are the rays possessing the greatest penetrative effect and they will excite or produce radio-activity at a distance of three feet or more. Rutherford's experiments show the relative penetration of the three classes of rays through aluminum sheets of varying thicknesses before there is a loss of half the intensity, which is formulated as follows:

α rays through a thickness of aluminum .0005 cm.
 β rays through a thickness of aluminum .05 cm.
 γ rays through a thickness of aluminum .8 cm.

According to Professor and Madame Curie radium rays act in many ways like light.

They reduce silver salts, peroxide of iron and bichromate of potash in presence of organic substances; while glass, porcelain and white paper are colored by them and yellow platino-cyanide of barium is transformed into the brown variety.

Becquerel in referring to the chemical action of radium rays, states that white phosphorus is transformed into red in



Fig. 4.—RADIOGRAPH OF DEAD HUMAN HAND.

twenty-four hours, mercuric chloride in the presence of oxalic acid, is reduced with the precipitation of calomel, and after long exposure the germinating power of seeds is destroyed. To the same chemical action the coloration of glass, porcelain, paper, and certain crystals as well as the painful physiological effects are due. The coloring of glass by radium rays finds its counterpart in the coloring of X-ray tubes. Those who have tubes steadily in use have noted that often they assume a violet tinge, similar to the flask spoken of by Hammer, colored by radium rays. It is also found by Becquerel that radium rays have the same power as the electric spark under exposure to heat of restoring phosphorescent properties to a body deprived of them by over-heating. The same is true of ultra-violet light.

Diamonds exposed in the dark to radium rays fluoresce

and scintillate in the most brilliant fashion. False stones are therefore easily detected.

By its action gases are thrown into a state of vibration which causes the production of their characteristic spectrum. The phenomena of the emission of heat is unique and unprecedented and a given specimen emits sufficient heat in an hour to melt its own weight in ice, while it maintains itself at a temperature of 1.5° C. above that of the surrounding medium. Nor is it affected by a wide range of temperature, the emission of heat going on without perceptible variation, whether on a summer day or at the temperature of liquid air. A sample of bromide of radium weighing 0.7 gramme tested by Dewar's method was found to be capable of volatilizing an amount of liquid oxygen and hydrogen equivalent respectively to 6 c. c. and 73 c. c. of the gases measured at the ordinary temperature. In liquid hydrogen, however, radium shows that it is not always unaffected by external temperature, for within a comparatively short distance of the absolute zero, the emission of heat, so far as present data can be relied upon, is augmented at the temperature of liquid hydrogen. This extraordinary phenomenon is increased in intensity at a point where all but the most powerful chemical affinities are in abeyance. This tremendous evolution of radiant energy goes on perpetually without combustion, without chemical change of any kind, without alteration of the molecular structure of the radium salt and without appreciable loss of weight. For one square inches of surface this loss of weight in ten million years is estimated at but one gramme. All of these facts are an apparent violation of the law of conservation of energy. From a close study of the phenomena exhibited by radium, Professors Crookes, Laborde, and Curie adduce a hypothesis that falls into harmony, not only with the law of conservation of energy but as well with the periodic law of atomic weights, or Mendeleef's theory.

They discard the old atomic theory and tell us that each atom is composed of a definite number of infinitely smaller but absolutely identical units, "each in constant motion in its intra-atomical orbit.

"Thus the hydrogen atoms consist of 700 'ions,' the oxygen atom contains 11,200 'ions' and gold 137,200 'ions,' per atom. The 120,000 'ions' which compose a

radium atom are in such a violent state of vibration or revolution in their orbits, that they are constantly flying apart and escaping from the atom into the ether, similarly as meteors leaving the solar system." * This active dissociation of intra-atomical units is termed radio-activity.

Professor Lodge regards this atomical disintegration as the normal process of nature, but proceeding at so slow a rate in the more stable atoms, that millions of millions of centuries would be consumed in its completion, while in radium the process is so rapid it can be observed.

The Curies put forth two hypotheses as to the source of the energy of radium.

"One of these consists in supposing the atoms of radium evolving and transforming into another simple body and despite the extreme slowness of that transformation which cannot be located in a year, the amount of energy evolved in that transformation is tremendous. The second hypothesis consists in the supposition that radium is capable of capturing and utilizing some radiations of unknown nature which cross the space without our knowledge." †

The theory is advanced by Professors J. J. Thomson and Rutherford that there is a succession of chemical changes going on causing the spontaneous projection of larger masses of material at enormous velocities, and that while certain portions are constantly dying out and becoming inert, other portions are constantly increasing in strength and power.

Substances which have been in contact with radium, become radio-active and their radio-activity lasts for varying periods of time. Professor Curie states that it is impossible for him to go near his instruments to make any measurements for hours after being near radium, and those who work with it, find it extremely difficult to keep their tools, instruments and themselves free from the radio-activity imparted by the radium. Falling rain and snow are for a time quite powerfully radio-active and lightning rods and even the leaves of trees also become radio-active. It was found by McLennan that rain caught in a vessel and immediately evaporated to dryness, imparted a radio-activity to the vessel. Hammer found a piece of cardboard which had formed the box hold-

* Medical Review of Reviews, August, 1903.

† Hammer. Personal Communication from Professor Curie.

ing his radium, luminous in the dark after six days. This radio-activity was stimulated by burning magnesium wire before it.

Physiological effects: Becquerel, Geitel, the Curies, and others have given important evidence as to the serious physiological effects of radium. Becquerel from carrying a specimen in his pocket for six hours received a serious burn on his abdomen. Hammer felt the effects for weeks from carrying a wooden box containing eight tiny tubes under his arm for several hours. He also experimented with an electric torpedo in the Aquarium at Naples by placing six tubes of radium on the back of the fish, which is shaped like a flounder, leaving them there for twenty minutes.

Prior to doing this both he and the members of his party had received powerful shocks from the torpedo's batteries. Upon removing the radium he tried for fifteen minutes to get a shock from the fish in the same manner as before, but without success. He admits that the fish "might have been out of shocks" but the question which naturally arose, was whether a partial paralysis had not been induced by the action of the radium rays. This seems more than plausible in view of the fact that Professor Curie found that a few milligrams of radium introduced beneath the skin of a mouse over the vertebral column produced death by paralysis in three hours; and tubes of radium placed in contact with the back of the neck of guinea-pigs have paralyzed these animals in a few hours, according to the length of the exposure.

M. J. Danysz* in a report to the Academy of Sciences, states that the application of a tube containing a salt of radium to the skin produces an ulcer in from eight to twenty days. A few moments' application is followed by a congestion of the human skin. When applied to the skin of a rabbit destruction of the epidermis follows, but when applied under the skin there is only a feeble reaction on the epidermis. It seems to penetrate the muscles with difficulty. Danysz also found that the intestines and the serous surfaces, when the tubes containing the radium were introduced into the cavity of the guinea-pigs and allowed to remain for several hours, were but little affected and no lesions produced comparable to those of the skin. Its action upon the nerve centers was

* Hammer, Radium, etc.

noticed in all animals subjected to experiment, but it was comparatively feeble in those whose osseous tissue protected the nerve centers. Application of the tubes containing the salt to the cranium caused paresis, ataxia, and convulsions, followed later by death. The same observer found that the salts of radium dissolved in distilled water, emits certain emanations which prevents the development of Anthrax bacilli. E. Aschinass and W. Caspari * found that the germs of the *micrococcus prodigiosus* when exposed to a radium preparation were effectively killed in about three hours by the action of the ray. The ocular phenomenon or sensation of light when a tube is held close to the eye or near the temple is one of the most familiar of the phenomena of this agent. This is attributed by Hammer to the phosphorescence of the pupil of the eye and also to a possible effect on the nerve centers. Interesting in this connection are the observations of M. Javal,† who suggests that blindness with alteration of the retina can be distinguished from that due to glaucoma or corneal opacity because patients with the latter conditions see rays from radium as well as do those of sound vision. This would indicate to the writer's mind that the effect is upon the nerve center. Professor Curie is authority for the statement that he would not care to trust himself in a room with a kilo of pure radium, as it would burn all the skin from his body, destroy his eyesight, and probably kill him. From its physical properties and physiological effect, a therapeutic action is predicated. As yet there has been but little done.

M. Danlos ‡ reports a case of lupus of the face exposed to the action of a salt of radium, at two points, which had a radio-activity of 19,000, for from 24 to 36 hours. The result was disappearance of the disease with the formation of a smooth, white cicatrix, blending into the surrounding normal tissue.

MM. Hallopeau and Gadaud § report that too prolonged exposure to the emanations from radium led to atonic ulcerations which lasted from five to six months. Dr. Blandamour has also used radium in lupus. His best results followed the use of salts with a radio-activity of 5200 and 19,000 respectively.

* Le Progrès Medicales, February 28, 1903.

† Revue Internationale Electrotherapie et Radiotherapie, November and December, 1902.

‡ Revue L'Electrotherapie et Radiotherapie, November and December, 1902.

§ Revue L'Electrotherapie et Radiotherapie, November and December, 1902.

The exposures were made from twenty-four to forty hours and were followed by profound erythema with maceration of the tissues exposed and even ulceration. The recovery was perfect and the cosmetic effect good, the resulting scar being white, smooth, and soft. By modifying the power of the radium and shortening the exposure he expressed the hope that the desired effect might be obtained without ulceration. Recently there were two cases reported to the Viennese Society of the Imperial Academy of Science,* which had been submitted to the action of radium. One, a man, aged sixty-two, had been repeatedly operated upon for cancer of the palate and lip, but with no benefit. Further operative measures had been declared useless. In the published report falling under the writer's notice, the radio-activity and technique were not given, but a bromide of radium was used. The tumors gradually and completely disappeared. The patient was treated in the clinic of the late Professor Gusenbatter. The second case was one of melanosarcoma which was also reported cured,

Equally interesting is the case of Mr. Mackenzie Davidson at the Charing Cross Hospital, London. A recurrent epithelioma of the rodent ulcer type, unsuccessfully treated by the X-ray was exposed for a short time to the action of radium. Four exposures aggregating an hour were given at intervals of a few days. In three weeks' time healing was established and in six weeks after two other applications, the cure was complete. For two years the writer has entertained the thought of trying the radium emanations in the treatment of malignant diseases, but owing to the limited supply, as well as the great expense, it was only recently made possible.

On September 15, through the courtesy both of Professor Charles Baskerville, Director of the Laboratory, Department of Chemistry, University of North Carolina, and Eimer & Amend of New York, the writer was enabled to use one gramme of chloride of barium and of radium contained in a sealed glass tube and having a radio-activity of 7000 in the treatment of two cases.† One, a case of sarcoma involving the left cheek, entire buccinator region and the mucous membrane of the lower left maxilla region, from the extreme angle of the jaw, extending upward and along the ramus of the jaw; the other, an inoperable primary pelvic case of epithelioma, involving the cervix, anterior and posterior vaginal walls; almost to

* N. Y. Med. Journal and Phil. Med. Journal, August 15, 1903.

† Since reading this paper two other cases have been added to the list, a recurrent epithelioma rodent ulcer type, involving loss of scalp and skull plates (the latter from arsenical paste) of from four to five inches in lateral and antero-posterior diameter; this case was treated September 25th for ten minutes; the other a secondary breast case with return of stabbing pain in scar and axilla but without macroscopic evidences of return of disease. In the latter case the pain has been controlled from the first exposure to the radium rays.

the introitus, rectum, bladder and both broad ligaments. Both cases have been under treatment, the first for a month, the second for three months, by means of the X-ray and ultra-violet light and both had been declared inoperable by the best surgical talent.

The case of sarcoma had been treated by external applications of the X-ray, twelve exposures for one month prior to coming under the writer's care and not only without improvement but with a steady loss. Since under care, now five weeks, the X-ray has been applied to the interior of the mouth as well as externally and applications of ultra-violet light, through focusing quartz lenses from a twenty-five-ampere arc made as well. By this treatment the patient had been relieved of the intense pain from varying periods of time but the relief did not persist. When first under treatment he gained three pounds. This he had lost, pain and distress were constant, face is anxious and worn, sleep very much impaired, appetite poor, progressive loss in weight, intense headaches. The ulcerated area was larger and on September 11, was covered with a dirty grayish exudate, foul to a degree, with ragged and necrotic edges.

The growth involving the region of the buccinator muscle was tense, hard, and extremely painful. Just inside the mouth under the upper lip, left angle of the mouth, there were two prominent tubercles; inability to open mouth, save for a scant half an inch and impossible to take anything but liquid food. On the night of the 13th, and the morning of the 14th of September he had a severe hemorrhage. Duration of the disease is placed at one year. Active evidences followed removal of an upper tooth one year ago. Tooth removed because of pain. Disease has steadily progressed since that time. September 15, 1903, the growth involving the left buccinator region was exposed to the radiating surface of one gramme of radium of 7000 radio-activity and contained in a sealed glass tube. The tube was held by means of a pair of long dressing forceps at three-quarters of an inch from the skin for ten minutes followed by a five-minute exposure made in the same manner to the skin over the ulcerated area. Upon the suspension of treatment the patient said he was relieved and that he could open his mouth with greater ease and comfort and that he felt better than any time since coming under care. He reported on the morning of the 16th that he had slept better the preceding night than for three months, that he suffered no pain and was only awakened by the dribbling of the discharge from his mouth. On the way to the writer's office had a feeling of faintness which was ascribed to his weakness and the intense heat and humidity. Appetite better the 15th after treatment and the morning of the 16th. Opened his mouth the merest trifle wider and with-

out pain. Practically no odor and but little discharge, no pain save a little upon deglutition: feels well.

Physical Examination:—Facial expression bright and pain free, looks rested; indurated tissues softer and more yielding to touch, softness characterizing the more superficial part of the induration; mucous membranes pale (pallor since use of radium) ulcer not so dirty looking but still gray in appearance. September 16, radium rays used as before, the surface exposure lasting but ten minutes; then the tube of radium salts was placed in a small test tube, the upper lip raised and an application of two minutes made at the upper left angle of the mouth, directly to the tubercles.

September 18, 1903.—In response to the morning salutation, instead of the former "not any different," or, "I am in great pain," the response was prompt and cheery, "I am very well." Restless in the night, but no pain, discharge thinner, diminished in quantity and of different odor, *i. e.*, not characteristic. The present condition: no pain save a slight sticking pain in the left of left alæ nasi, indurated tissues much softer, softness extending deeper than on the 16th. Ulcer clean and bright, red at its base, edges still somewhat ragged, entire surface of ulcerated area bathed in an exudate serous rather than characteristic gray. The upper lip at the left angle before immobile with prominent tubercles is now readily handled, the tubercles are much smaller and the mucous membrane is smoother and of a more healthy color.

Five days subsequently the patient was still almost entirely free from pain and was conscious of the cavity inside the mouth. This he had not spoken of at any time before. As there had been a good deal of numbness in all the affected tissues it is thought that this simply indicated a return to normal sensibility as the anæsthesia was better elsewhere. Discharge still about the same in quantity, thin and of a serous nature; no characteristic odor; sleep improved; appetite fair; induration softer than at previous visit; mucous membrane has lost the profoundly anæmic appearance which followed upon first treatment. The reaction established in the ulcerated area has passed, the circulatory conditions are less good and there is more gray exudate with ragged edges.* The usual X-ray treatment was given at this time as the writer had been obliged to return the tube of radium to Professor Baskerville.

The pelvic case had been under care for three months and has improved to date under the combined influence of the X-ray (internal application entirely) and ultra-violet light. Infiltration of vaginal walls is largely absorbed, hemorrhage

* September 25, 1903. Better, has gained one pound; no pain until September 24, no odor; discharge as before; ulcer cleaner; edges smooth; normal color, induration less.

under control, discharge also and the foul odor has entirely disappeared. Healing has taken place in the ulcerated area involving the cervix and the right posterior fornix. The patient's general condition is much improved, there is no characteristic pain, no cachexia, no loss of weight, her functions are well performed and she eats and sleeps well. There is, however, a discharge of blood from the rectum upon defecation and now and then at other times. Because of this and believing that the radium rays would penetrate more deeply than the X-ray the radium was used.

Prior to its use a physical examination was made showing elastic vaginal and rectal walls, no bleeding from the manipulation, no discharge, no odor, no ulcerated tissue, no pain, but the cervix uteri, and adjacent vagina through the glass water jacket of a vaginal X-ray tube, inserted to contain the tube of radium, were seen to be intensely congested, just ready to bleed and streaks of blood were numerous especially from the right fornix and posteriorly. In this water jacket closed at its distal end, the tube containing the radium bromide was placed and allowed to lie on the posterior surface of the water jacket for five minutes. It was then held five minutes more near the anterior surface of the tube, because of the vesical involvement.

September 16, 1903, the cervix uteri was found to be completely blanched and also the vaginal walls, with here and there tiny little punctate spots of bright red, not larger than the smallest pin head. There was no discharge, no odor, and no pain. The writer questioned the advisability of making another exposure at this time but as it was the only opportunity of doing so before returning the radium to Professor Baskerville a five-minute application was made as before.

September 18, 1903.—Speculum examination showed the cervix uteri and vagina intensely congested and bleeding; no treatment given. It is evident from the reaction that a mistake was made in reapplying the radium in this case on the second day.

September 21, 1903.—Five days subsequent to the use of radium, no bleeding, no odor, no discharge, no ulceration and vaginal and cervical mucous membrane normal in appearance. General condition good, but complaining of some vague discomfort which may be attributed to the fact that her occupation necessitates much standing and walking. There has been no bleeding from the rectum since the radium was used.*

This report is made because, taken in connection with the experience of others, it seems to foreshadow an important place

* September 25—Is looking and feeling well. No symptoms, still no bleeding from rectum since radium first used, ten days since.

in medicine for radium. The writer offers no opinion as to the outcome of these two cases. They will be carefully watched and ultimately reported. The technique evolved is given, in the absence of any knowledge on the subject. It may not stand the test of time. Further experience can only prove this. There is absolutely no guide for the therapeutic applications of radium, and the writer preferred to err on the side of least danger to the patient. The profound physiologic action obtained would seem to indicate that the more powerful activities and long exposures are not necessary.

Of the three sets of rays in radium α , β and γ evidence points to the identity of the α ray with the Roentgen or X-ray, in the matter of penetrating opaque bodies. This and subsequent facts suggest to the writer's mind, a corroboration of the position taken by the Drs. Shields,* that it is not the X-ray but the cathode ray which establishes physiological action and therapeutic effect. To X-rays, however produced, whether from an excited X-ray tube or a radium salt, the power of penetration of opaque bodies is then due. In the β rays a higher vibration is reached analogous to the cathode rays while in the γ rays a still higher degree of vibration is attained, capable of a more powerful chemical action and profounder physiological effect. This is what we seek in combating disease of the nature of cancer. In a daily experience with these cases the writer has come to feel that if a higher, more penetrative, and a more active chemically disorganizing vibration than is obtained from an X-ray tube, could be applied in a lethal dose, to the cancer cells, better results would necessarily accrue. So much is accomplished with the X-ray that one can but feel that an energy of the same kind, but of greater intensity, would do more. In establishing the treatment by means of radium rays the purpose would be best met by a full dose, whatever that proves to be, in order to act destructively upon the foci of disease.

The fact that radium emits rays of a greater penetrating power and of a higher vibration than the cathode rays, *i. e.*, the γ rays, taken in connection with the change in appearance and relief obtained in the writer's case of sarcoma and the cure of the cases reported, stimulates the hope that in radium a therapeutic measure of value over and above the X-rays

* Cincinnati Lancet Clinic, April 21, 1903.

is at command. In the case of sarcoma the best resources of excited X-ray tubes has been faithfully tried, even to the production of an X-ray dermatitis, but up to the time of the use of the radium he was rapidly losing ground.

Unless radium should prove for him an Aladdin's lamp of more than fabled power, he is doomed.

There are submitted herewith two tubes of radium chloride, one containing a decigramme of 3000 and the other a gramme of 7000 radio-activity. At night in the dark, they look like glowworms as they lie on my study table. They can be placed within the accessible mucous cavities according to the location of the disease within the nose, uterus, urethra, and a device could unquestionably be constructed permitting the placing of one in the œsophagus or stomach even, if it is found that mucous membrane contact is the better one. In breast cancer a puncture could be made with the electro-cautery, in order to secure a bloodless opening and the tube could be carried directly within the malignant.

To the over-tired X-ray machine and tube worker, the thought of securing the same and perhaps better results with one of these, quiet, inoffensive, and unaggressive tubes of radium salt is entrancing. The use of radium can never be common, not alone on account of the initial expense, but because of its scarcity. The tube with which the writer's work has been done is valued at \$200. Future work will be done with the same radio-activity.

Just here, as showing not only the unity of scientific interest but the universality of humanitarianism is appended a letter received from Professor Baskerville on the 21st.

"MY DEAR DOCTOR:

" . . . I am very glad you kept the radium long enough to make some use of it and I wish to say right now that whi'e I wanted it here and shall need it off and on, if you can save the patient about whom you write so interestingly, by its use, wire me and I will send it back to you. Yours very truly,

"CHARLES BASKERVILLE."

79 Madison Ave.

**SELECTIVE, HARMONIC, ELECTRIC VIBRATION:
A NEW PHYSICAL THERAPEUTIC AGENT.***

BY MORRIS W. BRINKMANN, A. B., M. D., NEW YORK.

Every physical agent which can influence protoplasm in the living is a factor of importance; either in the physiological laboratory or as a therapeutic agent.

All apparatus which produce movement of an undulatory character in the living tissue of man, have their position in a scale of values. What the particular position of any rate may be, is a matter which will be absolutely determined by special experience as well as by appropriate instruments of precision for observing and recording results. This scale it is safe to state will be determined at no distant date.

A classification embracing all of the rates of movement would be roughly as follows: First, the simple rate, and, second, the multiple or compound rate.

The simple rate being subdivided into (a) slow, (b) moderate, (c) high frequency.

The multiple rate being first composed of (a) any number of combinations of single rates of vibration arranged harmoniously or of the same arranged in discord; or (c) any combination of multiple rates from single blows, 16 to 40,000 per second, or any multiple rates above this to infinity.

Measurements in connection with acoustical studies as made mainly by Savart, Despretz, Helmholtz, and Preyer have established the fact that independent strokes up to thirty per second were perceived as such and that above this number a distinct note was discernable. It is, however, true that a minimal limit varying between sixteen and twenty-four for the normal human ear was established by Despretz. Helmholtz believes that a rate of forty per second fixes the minimum limit for a definite musical value.

The maximum limit as established by Preyer for a musical note, was 41,000 per second. Many persons notwithstanding, with average auditory acuteness, were absolutely unable to respond to rates varying from 16,000 down to 12,000, and some

* Read at a meeting of the New York School of Physical Therapeutics with demonstration of apparatus at 465 Lexington Avenue on the evening of September 18, 1903.

in fact less than this. In other words, they were deaf to this rate. All physicists agree that variations in the auditory sense, to a wide degree, are compatible with a physiological condition of the organ of Corti and the central perceptive apparatus.

For our purposes then let us assume these measurements as a starting point in our studies of protoplasmic vibration generally; admitting that the histological character of the elementary cell varies according to its type and special structure. Sound waves are subject to the same laws as vibratory movement in general. We have rates of different velocities in fixed times, acoustically called *pitch*.

The extent of amplitude of vibration determines, in the case of sound, the *intensity*.

The *timbre*, however, is a quality dependent upon other causes than either pitch or intensity. Variations in the quality of the same note as produced by a string, wind or reed instrument are absolutely familiar to all. The character of timbre as exhaustively studied by Helmholtz, both analytically and synthetically, establishes the fact that the qualities of a similar note as produced by different instruments is caused by the coincidence of complicating harmonics. That is, a note is either simple, rich, and grand, sonorous or shrill according as the note is simple or single in harmonics or more rich in them. (The word harmonic as used here is in the physical sense and not the popular.) The simplest instrument is probably the tuning-fork.

We will roughly then have rates (1) below 40 per second; (2) between 40 and 40,000 per second; (3) above 40,000 per second.

The object in taking these particular measurements is based upon the fact that we have here a practically fixed boundary as established by repeated measurements of trained and authoritative observers on a certain tissue of the living human body—a highly specialized and trained tissue; it is granted. Whether other tissues are perceptive to varying rates within 40 and 40,000 is a matter which experiment alone can prove; of this more will be said at another point in this discussion.

All rates above 40,000 per second give no other evidence than our perceptive analysis can apparently determine, varying between simple perception and complete paralysis. The

tactile and temperature sense are here each concerned as also the muscle sense. Heat or temperature and its quantitative variations are certainly analyzed between temperatures varying from 32°-130° Fahrenheit or perhaps higher up to paralysis due to tissue destruction. Gentle stinging up to severe pain and then anæsthesia correspond to the tactile sense, and muscular effort from slight to powerful tonic spasm and finally to tissue destruction and paralysis. All of these certainly establish means for analysis of a rate of movement, although this may justly be debated as again the rate may not entirely produce the phenomena. Amplitude of vibration being perhaps as much concerned as velocity and wave length.

The taste and smell sense cannot be fairly interrogated with reference to high frequency electrical currents as the production of ozone and nitric oxide gases, veil any refined perception. The auditory sense it has already been shown cannot analyze sounds in excess of 40,000, so that even if there were sound perception it would be simply unintelligent irritation and from this up to the point where anæsthesia of this sense or subjective silence existed.

Let us now return to the harmonic vibration in the musical sense. As ordinarily understood to mean synchronous sounds of different pitch, producing a pleasurable sense in either a major or a minor sense. Contradistinguished from the unharmonious or discordant grouping of synchronous combinations of single notes.

One cannot help wondering at the effect of a harmonic association of simple notes upon the auditory apparatus and the economy generally. It has been assumed commonly that these actions and pleasurable feelings on the general body are reflex. Are we warranted in accepting this assumption? On the contrary, it is known that certain organ pipes having rates below sixteen per second are used for the purpose of increasing the grandeur and impressiveness of music. The body feels the vibration but the ear does not hear the sound. The body is said to thrill. It attunes itself to the rate.

Even when the low rate is not used musically, there are thrills and peculiar perceptions as frequently described in popular language. That is, with certain vibration rates, amplitudes, timbres, and associated rates, general sensation is influenced.

We feel music, therefore, as well as hear it, different persons feeling differently, due, of course, to their individual attunement at the particular time. The auditory perception and analysis are remarkable, but by no means so wonderful, however, as the ordinary sensory perception as evidenced by the general thrill. For the ear by training and use is furthermore to be regarded as a highly developed as well as special organ, so that its analysis and discrimination would be expected to go much further than the general sense perception.

We have practically demonstrated that general sensation is responsive to vibration with the 40-40,000 rate. Anyone having used mechanical vibration subjectively with a rheostat employed in the current circuit of the motor, knows that rates up to 3000 per minute are analyzed perfectly or maximum of fifty per second,—a demonstration that the sensory apparatus and muscle sense are estimating and adapting themselves, at least to this single rate of mechanical oscillation.

The first suggestions of a sensory and muscular analysis of rates of vibration contained within the musical limits were reached by the writer while using a faradic coil current interrupted by a ribbon vibrator whose tension was regulated by a lever and thumb-screw. Certain notes were observed to be much less disagreeable than others, certain ones having sedative quality while the amount of current flowing through the primary and the inductive quantity of secondary were fixed. This was observed with notes of even low pitch.

The idea then occurred that the general law as related to string instruments prevailed in the human tissues, excepting, of course, bone,—namely, that thickness, tension, and length regulated the particular rate or note to which a muscle, nerve or other tissue was attuned or responsive. Furthermore, that this particular means of developed movement or sensation could be made a measure of the physiological or pathological condition in the living. Upon this work some observations have already been made.

Later the idea occurred, that if a single note by its being in consonance with the particular tissue under consideration, were combined with other notes or rates of movement which were musically harmonics of the first, a distinct effect should be produced; that is, distinct as far as sensation was concerned, as also in muscular contraction, and this whether gal-

vanic or faradic current be employed. Let us take the case of striped muscle. We have here an ensheathed mass, made up of bundles of fibres which in turn are made up of single filaments. We can safely assume that these primordial elements are not of equal lengths or tensions. It follows that in order to secure a very general contraction of the bulk of the ultimate fibrillæ, the concurrent use of several rates of oscillation would be necessary. That these several rates must be determined for particular muscles or other tissues is self-evident. Should this theory work out satisfactorily in practice, a notably stronger and less disagreeable muscular contraction must occur.

As a consequence of all of the above, which was mostly speculative, an apparatus was devised by the writer having three ribbon vibrators of different thicknesses, each being adjustable for tension by its own lever and thumb-screw; each also having its own contact point adjustable. The primary current instead of passing through the ordinary spring or ribbon vibrator was split into two or three divisions, according to the number of ribbons in use. In other words, we have a multiple interrupter. We therefore get induced currents in the secondary of desired speeds, as determined by the tension or attunement adjustments. The current tension is regulated by the amount of current allowed to pass through the primary, the amount of secondary embracing the primary, and the particular winding of secondary used.

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THE ROENTGEN RAY AS AN AID IN DIAGNOSIS.*

BY HERMAN GRAD, M. D., NEW YORK.

(Continued from page 612.)

The extent of our knowledge gained from skiagraphy of fractures and dislocations can hardly be appreciated. Many valuable papers on this subject have been presented before this association and the value of the Roentgen ray in fractures pointed out more forcibly than I could accomplish, therefore I shall say nothing further about it. It remains established that to-day in treating a case of fracture it is not a matter

* Read at the thirteenth annual meeting of the American Electro-Therapeutic Association, held at Atlantic City on the 24th of September, 1903.

of the kind of splints to be used or the kind of method of reduction and immobilization of the fragment, but each case is necessarily treated on its own merits, because the skiagraph shows just how the solution of the continuity of the bone exists, how the fragments lie, and how best to reduce the displacement. With the fluoroscope at hand, we can see whether the fragments are in apposition after reduction, and gauge the extent of our immobilization perfectly. We need not care for systems or methods of reduction so long as immobilization is perfect, we expect and do obtain good results. Should the fluoroscope and plate show defective reduction and imperfect immobilization the dressing and splints should be removed and different manipulation tried until perfect reduction is accomplished. The kind of splints and method of reduction counts for naught. Perfect reduction and immobilization is what the surgeon is after and then he can assure himself with fluoroscope and plate. One can hardly describe the great comfort a skiagram gives the surgeon in dealing with the fractures. At the present day it is useless to wrangle over the question whether the fracture is intra or extra capsular, intra or extra articular; whether a dislocation also exists or not. The Roentgen ray at once settles the question and lays bare the steps for remedying the lesion.

A case came recently under observation where a girl of ten sustained an injury to the elbow joint (See Fig. 2). The patient complained of very little pain, but considerable swelling and some ecchymosis made its appearance soon after the injury. A diagnosis of dislocation of the elbow was made and anæsthesia with reduction advised. The family then consulted another physician who recommended to have an X-ray picture taken. The Roentgen pictures at once disposed of all conjecture and doubt about the injury, as it showed a separation of the epiphesis of the lower end of the humerus, and a dislocation of the lower fragments. In other words, a serious and complicated injury was clearly shown. Without the aid of the radiograph, the injury would have been called a dislocation, although a change in the diagnosis would have been made as the surgeon would have found difficulty in maintaining a reduction of the supposed dislocation. Finding that his fragments slipped when pressure was removed from them, he would have then discovered that he was dealing with

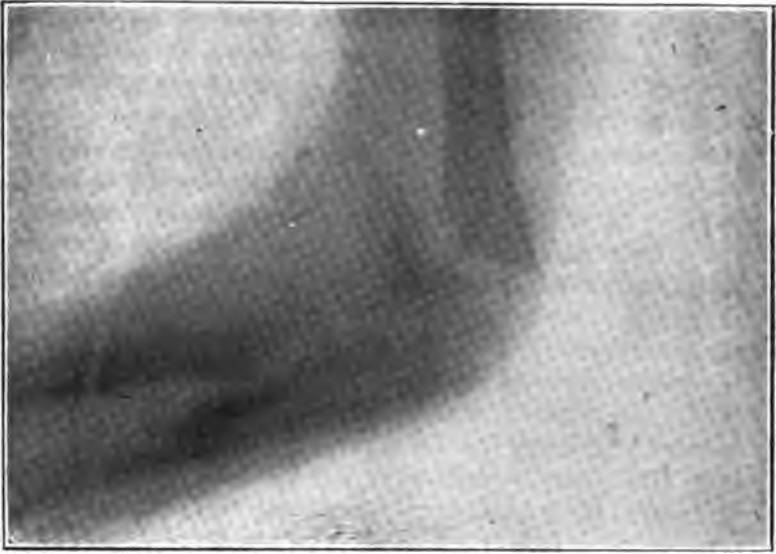


Fig. 2.

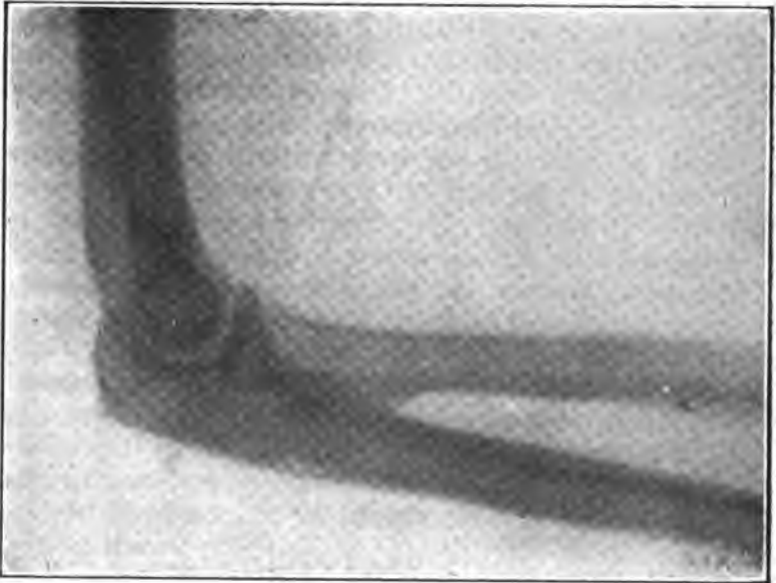


Fig. 3.

a separation of the epiphysis. With the aid of the Roentgen ray not alone was the diagnosis an open book, but the manner in which a reduction was to be accomplished was also clearly shown by the picture.

Not alone is there a positive value of the Roentgen ray in the diagnosis of fractures, but there is also, one may say, a negative value equally important. Under many conditions, and after certain injuries, it is absolutely impossible to say that a fracture does not exist, and the case is therefore treated as though a fracture were present. The Roentgen ray, under these conditions, will save the patient the annoyance of wearing cumbersome splints, to say nothing of the anxiety and loss of time. In a case also of recent date, a patient who had sustained an injury to the upper extremity presented himself. The injury seemed to be a severe one. The cardinal symptoms of fracture except crepitus were present. In addition, four lacerated wounds were present. A diagnosis of fracture of the humerus was made by two physicians. When the patient presented himself, he was wearing anterior and posterior splints. The Roentgen ray showed all the bones of the extremity intact (See Fig. 3). The removal of the splints brought comfort to the patient, and with a cheerful frame of mind a successful therapy was instituted.

In every case of injury, therefore, a skiagram of the bone should be made. If a fracture does not exist, the patient is spared the annoyance of wearing a splint for a supposed injury. If, however, a break in the bone does exist, the skiagraph will not alone indicate the true and existing condition of the fracture, but will at once indicate the speediest and best method of reduction. There is, however, still another question in connection with fractures and skiagraphy that is by no means slight in its significance and importance, and that is the medico-legal question involved. A well executed skiagraph is the best possible evidence the surgeon can possess in protecting himself against possible lawsuits. From the Roentgen ray picture, the patients themselves can see the extent of the damage to the osseous structures and, if a disability results from the effects of the fracture, the skiagram will doubtless show the reason of such disability. It would be preposterous on the part of the patient to blame the surgeon for a disability that resulted wholly from the

peculiar nature of the injury. With a skiagram in the possession of the physician, he need fear no malpractice suit, if he has been conscientious in his efforts and has employed all methods known to science for the correction of the condition and alleviation of suffering. Much more could be said on the interesting subject but time will not permit.

Brilliant is the record of the Roentgen ray in the diagnosis of fractures and dislocations; nor is its value in the diagnosis of foreign bodies less so. In both it illumines, in both it lends knowledge that could be obtained in no other way. A foreign body capable of throwing a shadow on the fluoroscopic screen can be located by the X-ray on a sensitized plate. This is familiar to the world in general and the physician in particular. It only remains now to be emphasized that the rays should receive their due recognition in this field of diagnosis, and every opportunity should be given this agent in locating foreign bodies in any part of the body. The technique is easy. It can be carried out with expedition and promptness. It makes no difference how ill the patient may be from the effects of an injury, a skiagram of the anatomical area where the foreign body is suspected to be lodged or injury sustained can be taken without disturbing the patient too much. In gunshot wounds, no matter how critical the patient's condition may be, taking the skiagraph of the affected part need not be delayed; for the patient need suffer no disturbance. Electricity is now obtainable almost everywhere and a coil can easily be brought to the bedside of the patient, a sensitized plate slipped under the affected part and a skiagram obtained in a few minutes. The wealth of information that such a skiagram may furnish is well known. The literature is abundant with reports of the successful location of foreign bodies and their subsequent removal effected by methods as ingenious as they were brilliant.

In locating foreign bodies and fractures by means of the X-ray, no great reliance should be placed on the fluoroscope alone, except in the simple cases. It will be far safer to take a skiagram to confirm the fluoroscope picture. Errors will thereby be avoided. Even with a good X-ray and patient and parts in the best possible position, a fluoroscopic picture alone may lead to error. Not so with the plate. If the negative is properly interpreted, error is not likely to follow. Under

the caption of foreign bodies, one may also speak of the various calculi in the human body. Renal, vesicle, and hepatic calculi have been successfully located by means of the X-ray. A negative that shows the shadow of a calculus is certainly a valuable diagnostic evidence; one well worth the time and trouble devoted to obtaining it. The possibility of skiagraphing ureteral calculi has been demonstrated in a few cases. When interpreting negatives of this class, however, great care should be exercised as the possibility of error is very great. A large part of the lower portion of the ureter is located against the bony structures of the pelvis; therefore when making an X-ray picture the shadow of these osseous structures may cause confusion in reading the negative. In order to avoid errors absolutely it is best to endeavor to pass a waxed ureteral bougie and verify the shadow on the negative. In taking skiagram for suspected stone in the bladder, good results have been obtained by placing the plate well over the abdomen, including the pubic region. The anode being so placed that a straight line drawn from the middle of the anode to the center of the plate will pass through the center of the outlet of the pelvis.

The fluoroscope is of much practical utility in examining for diseases of the chest. Tubercular foci even in the incipient stages have been diagnosed by fluoroscopy. Normal lung tissue allows the X-rays to pass freely. Any deviation from the normal fluoroscopic appearance of lung tissue is caused either by a congestion of the blood-vessels or an exudate of the alveoli of even small bronchioles. Round cell infiltration of the lung tissue will also throw a shadow on the fluoroscopic screen. Tubercular cavities, abscesses, and tumors can be diagnosed with the fluoroscope and their location accurately determined.

Careful fluoroscopy and skiagraphy of the chest cannot fail to have important bearing on the surgery of the chest in the future. This branch of surgery is hampered by almost unsurmountable difficulties. With the aid of the fluoroscope, much may be accomplished in the future in this somewhat neglected field of surgery. The fluoroscope will outline for the surgeon the pathological region, and show him precisely how best to attack the offending area. In empyema and

effusions in the pleural cavities much valuable information has been gained from the fluoroscope. The situation and extent of these effusions are clearly mapped out and the relative position of the various organs of the chest cavity are observable with almost incredible clearness. Nowhere is the fluoroscope more serviceable in diagnosis than in clinical examination of the chest. Here the thoracic organs are seen in motion and their relative size and position can be determined. To watch the graceful excursions of the diaphragm, the up and down movements of the liver and spleen, the rhythmic contractions of the heart, is indeed interesting. The fluoroscope has been valuable in locating stenosis of the œsophagus. A rubber tube is passed down to the obstruction, or the patient is given from twenty to thirty grains of bismuth subnitrate. This chemical gives a shadow on the screen and thus assists in locating the stenosis with precision.

The author is fully aware of the shortcomings of this paper, but if it points out, though feebly, some of the uses of the X-ray in diagnosis he shall feel rewarded for his efforts. In a humble spirit, he ventures to say when you are in doubt with your diagnosis use the fluoroscope, for a shadow may show light.

Discussion.

Dr. George Z. Goodell said that a few weeks ago a woman while washing a tablecloth had felt something pain her hand, and thought that the head of a needle had passed into the thumb and forefinger. A physician had probed through the puncture found there but had found nothing. The woman then came to me for a radiographic examination, and the skiagraph showed one-eighth of an inch of the head portion of a fine needle. It was interesting to note that the fluoroscope showed absolutely nothing.

Dr. Grad said that one could not always rely upon the fluoroscope; hence a skiagram should always be taken.



ALPHONSO D. ROCKWELL, A. M., M. D., President of the American Electro-Therapeutic Association.

Editorial.

THE THIRTEENTH ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THE meeting of the Association held at Atlantic City on the 22d, 23d, and 24th of September was one of unusual interest and largely attended by the fellows of the Association. The Executive Sessions were conducted with the usual harmony and good feeling, showing marked interest in the affairs of the Association. The reports of the various standing committees were unusually complete as will be seen elsewhere in the published transactions.

The recommendations of the committee on the St. Louis Exposition to hold the next meeting of the Association at St. Louis during the week in September, from the 12th to the 17th inclusive was adopted, and the 13th, 14th, 15th, and 16th of September were adopted as the days on which the meeting is to be held. During the same week, there will be a meeting of an International Electro-therapeutic Congress and various other electrical congresses. The well-known authority and prominent member of the Association, Dr. A. D. Rockwell, was elected President of the Association for the coming year, upon which selection the Association is to be congratulated.

The scientific programme was one of unusual interest and the papers of such character as to enrich the literature of the subject. These sessions were marked by a large attendance, and the interest was manifested in the general discussion of the various papers.

The courtesies of the local profession were shown at the reception given on the evening of the second day to the fellows and their families. The session will long be remembered by those who attended as one of the most profitable and instructive in the history of the Association.

DR. MAURICE FIESCHER PILGRIM.

IT is with profound sorrow that we are called upon to announce the death, after a brief illness with pneumonia, of our highly esteemed and beloved friend and associate editor, Dr. Maurice F. Pilgrim. In the prime of his manhood, with his life work unfinished, he has gone. It was his earnest prayer to be restored to health that he might use for the good of humanity the knowledge which he had acquired. During his illness he said to the writer that he had collected data and facts, and he only wished a little more time in which to place them in tangible form, when he would be willing to go. He fought bravely to live, but his energies had been exhausted by an intense mental strain. During the past summer he had written a work on psychiatry, which will be published.

Few have grasped so firmly and practically the relationship between the *objective* and *subjective* mind as had Dr. Pilgrim. At this time, when the extremes of materialism and spiritualism are so evident, strong men who occupy the safe middle ground in the consideration of this great subject are needed. Such was Dr. Pilgrim, and great is the misfortune to science and the medical profession.

* * *

IN MEMORIAM.

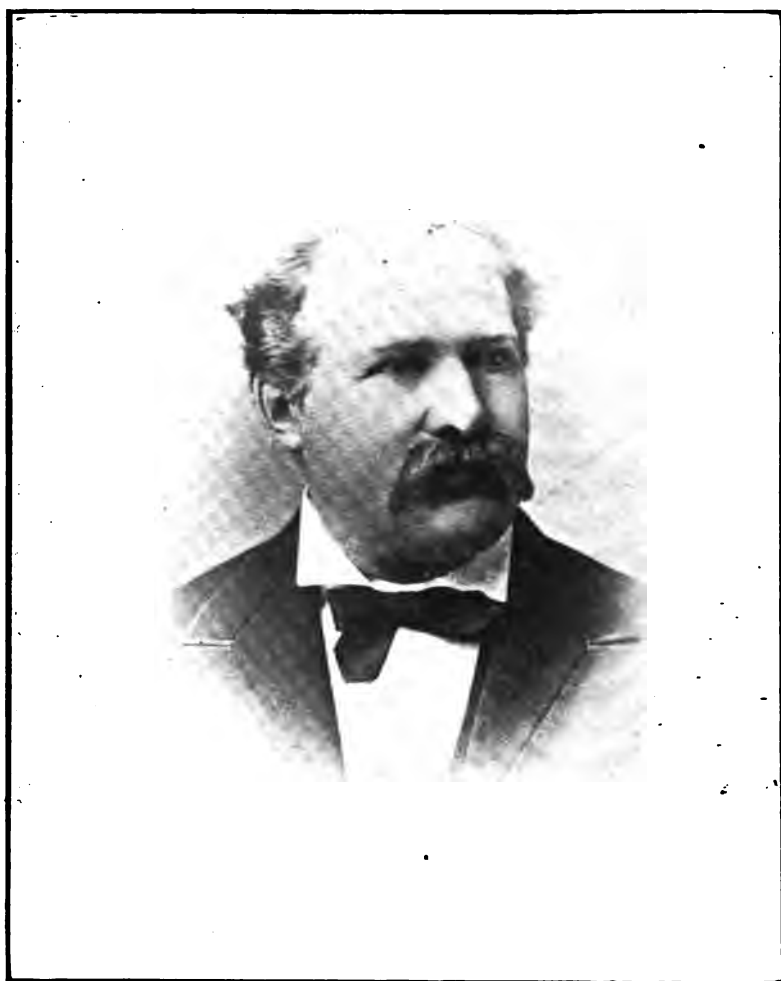
AT a meeting of the Faculty of the New York School of Physical Therapeutics, the following resolutions were unanimously adopted:

Whereas death has removed from us our esteemed associate and confrere, Dr. Maurice Fiescher Pilgrim, whose faithful service as a teacher in the school, marked by keenness of thought, earnestness of conviction, honesty of purpose, loyalty and kindness of personality, endeared him to all his fellow workers,

Be it resolved, that we, members of the Faculty of the New York School of Physical Therapeutics, extend to his bereaved family and friends sympathies and condolence, and, in token of this esteem, the secretary be instructed to forward a copy of these resolutions to his family, and to forward them for publication in the medical press.



Physicians seated.—W. W. Eaton, W. B. Snow, C. D. Files, A. C. Geyser, R. J. Nunn, D. R. Brower, C. E. Skinner, A. D. Rockwell, Boardman Reed, Margaret A. Cleaves, W. P. Spring, A. C. Rainear, G. B. Massey.
 Standing, Middle line.—F. B. Bishop, Robt. Rayburn, C. R. Dickson, L. M. Earley, Lucy Hall-Brown, T. D. Crothers, M. F. Pilgrim, C. H. Shepard, F. H. Morse, W. J. Herdman, G. Z. Goodell, J. H. Stuart, Russell Boggs, G. C. Johnston.
 Standing, Upper line.—T. A. Pease, A. W. Boyliss, R. G. Brown, A. W. Baer, Laura V. Gustin-Mackie, A. J. Abeel, C. N. Bibbins, H. H. Cook, M. M. Johnson, M. K. Kassabian.



ROBERT NEWMAN, M. D.

MEMOIRS OF DR. ROBERT NEWMAN.

THE death of Dr. Robert Newman at his summer home at Monument Beach, Mass., was a shock to the inhabitants of the village where he resided, as well as to his large circle of friends scattered throughout the country.

He was married at Monument Beach to Miss Ada Blackwell in the Bourne Church, twenty-six years ago. Two months ago in that church his only daughter, Louise, was married to Myles Walsh of New York City. His funeral took place in the same church on August 31, 1903.

The following memoirs, prepared by Dr. F. B. Bishop, of Washington, D. C., and Dr. G. B. Massey, of Philadelphia, Pa., bespeak the appreciation with which he was held.

Dr. Bishop writes: No pen of mine can every portray the beauty, nobility, grandeur, and, at the same time, the simplicity of character of this truly great man. Guileless himself, he looked upon all with that true love and human kindness possessed only by the pure of heart. He seemed to have developed to a high degree the faculty of seeing one's virtues only. By his own conception of what they should be, so were men measured by him, and so to him they were.

The winter of his life seemed (to all who knew him) as but one continuous Indian summer, and many are the friends who sought the sunshine of his presence. All who knew him loved him, and those who had known him longest, loved him best.

His home life was one of perpetual and unalloyed happiness where his genial smile and open heart reigned supreme, and were ever ready, day or night, to expand in hearty welcome to any or all of his many friends; many of whom had felt it a divine privilege to accept his hospitality.

He was charitable to a fault, ever thinking and acting for the good and comfort of others. With a mind as pure as the lily, a heart as gentle as a child, he requested that no crêpe should be placed upon the door for him, but flowers, beautiful flowers, that spring from the earth in all their beauty and fragrance, at the touch of the Master's hand. So we believe that a soul like his must spring from the last resting place, at the call of the Master, to receive his great and everlasting reward.

Good-by, our true, our noble, and our loving friend. Your life has been a sermon. Your death a triumph.

Dr. Robert Newman as a physician has been known by his works for many years—not in any circumscribed area but throughout the whole world. He was born and in part educated in Germany.

The following is an abstract from a Biography of Eminent American Physicians and Surgeons:

“Arriving in New York, the doctor devoted his attention to the study of medicine, and became a pupil of Dr. Joseph Kammerer, whose specialty was gynecology, being on the staff of the German Dispensary. After studying at the New York Medical College, at the Long Island College Hospital, and at the Bellevue Hospital Medical College, he was graduated at the Long Island College Hospital Medical College in 1863, and later at Bellevue Hospital Medical College in 1869. During the Civil War in 1863 he went to the front as State's volunteer surgeon. In the same year he was appointed physician in the Northern Dispensary, and from that period he has been a resident of New York City. In 1864 he was appointed by Professor Hutchinson, prosecutor and chief of the Surgical Clinic in the Long Island College Hospital; also physician to the Northern Dispensary and a sanitary inspector in the Council of Hygiene and Public Health. In the same year, he became a member of the New York County Medical Society, and was elected a member of the New York Pathological Society. During the next year, 1865, he was appointed district physician to the New York Lying-in Asylum, and joined the Medico-Historical Society, whose object it was to classify the members of the medical profession and print a list of the regulars in the Medical Register. When the Metropolitan Board of Health was organized in 1866 he was appointed a sanitary inspector. His zeal in his duty in this capacity was too great, and while inspecting an old house in Nassau Street with too much minuteness, he fell through a trap-door, and was injured to such a degree that he was laid up for six months, and then went to Europe to restore his health. During the same year, he operated successfully in ovariectomy, and was the first who removed the tumor with a galvano-cautery battery introducing antiseptic precautions, drainage, and washing out the abdominal cavity. In 1867 Dr. Newman was one of the founders of the Medico-Legal Society,

and its first vice-president. The New York State Medical Society appointed him a committee to investigate the result of consanguineous marriages. For two years he corresponded with medical men of all the world in order to complete his investigation, and made an elaborate report to the Society at the meeting in 1869. Soon after he was one of the founders of the Forensic Society, which had only a short life. In 1870 he was appointed chief medical examiner by the Republic Life Insurance Co., and the Gynecological Society of Boston elected him a corresponding member. He was also a member of the Neurological and Electrological Society, and in 1872 became a permanent member of the American Medical Association, and in the next year, 1873, he was elected a permanent member of the New York State Medical Society. After having delivered some lectures he was elected, in 1874, an honorary member of the Ulster County Medical Society. During the same year, he was also honored by elections as vice-president of the Alumni Association of Bellevue Hospital Medical College, and president of the Northwestern Medical and Surgical Society, of which he was one of the founders. In 1875, Dr. Newman received the appointment as surgeon of the Northwestern Dispensary, which position he held for fourteen years, and during that period he performed many operations. For several years, beginning in 1879, he was Corresponding Secretary of the Alumni Association of Bellevue Hospital Medical College. Since the organization of the Alumni Association of Long Island College Hospital in 1880, Dr. Newman has been on the Board of Managers and successively its vice-president, and lastly president. While Dr. Newman had a preference for surgery, he made electrolysis his special study, in which branch he was the acknowledged authority; and his improved method of treating strictures by electrolysis, which he had practiced successfully now for twenty-three years, is well-known and accredited. All the electrodes for this operation have been devised by him and are distinguished by his name. In 1886 he also devised the galvano-cautery sound for the treatment of hypertrophied prostate. In medical literature the doctor is not unknown. Articles from his pen read before medical societies in this country have attracted so much attention that they have been translated and published in the leading European medical journals. He has contributed to medical

literature seventy-two articles; and when in Berlin in 1890, at the International Medical Congress, he read a paper in German upon 'Electrolysis.' Beside the societies previously mentioned, Dr. Newman was a member of the following societies: The Physicians' Mutual Aid Society; Society for Relief of Widows and Orphans of Medical Men; the New York County Medical Association; the New York State Medical Association; the Society of Medical Jurisprudence; the New York German Medical Society; Fellow of the American Electro-therapeutic Association; honorary member of the Berlin Cremation Society, and honorary member of the Danbury (Conn.) Medical Society. He was also in active service as Consulting Surgeon to Hackensack Hospital; Consulting Surgeon to Bayonne Hospital; Consulting Physician to Home for Aged and Infirm at Yonkers, and Consulting Surgeon to German Dispensary, West Side, New York, and McDonough Memorial Hospital, New York. In 1896 he was elected president of the American Electro-therapeutic Association.

"Recent Appointments. In 1900, Chairman of the Executive Council of the American Electro-therapeutic Association. In 1901, Professor and President of the Faculty of the New York School of Physical Therapeutics; Associate Editor of the JOURNAL OF ADVANCED THERAPEUTICS. In 1902, President of the Clinical Society of the New York School of Physical Therapeutics. In 1903, Honorary member of the North Western Medical and Surgical Society. Honorary Alumnus of the National College of Electro-therapeutics, with degree of M. E. (Doctor of Electro-therapeutics)."

Thus, after forty years of hard work and many honors, he died as he had lived—fighting for the cause of suffering humanity. Even to the moment of his death his chosen profession claimed his labors.

Only time and the inevitable Reaper could master this good and great physician.

F. B. B.

* * *

DR. ROBERT NEWMAN AND HIS WORK.

IN the midst of our annual interchange of thought and fact for the benefit of science and humanity, we pause to record a sorrow: the passing away from our councils of a personal

friend and former President, Dr. Robert Newman. The news of the sudden death of Dr. Newman on the eve of a meeting which he was doing so much to promote, cannot do otherwise than profoundly shock the members of this Association, who have grown to look upon him as an essential part of their annual gathering. From the first preliminary meeting of the Association to the present, his work as an earnest advocate of truth and a tireless organizer has been second to none. It would seem that we can hardly do without him. Not with him was the fulfilled honors of the presiding office followed by the lessened interest in the Association, as sometimes happens. From this well-deserved distinction he stepped down again to the floor, and resumed there his continuous labor for science and for the American Electro-therapeutic Association.

Dr. Newman's life shows us that some of the stuff that goes to make martyrs is still amongst us. He was not sent to the stake as of old, but he suffered in that fight between the independent investigator on the one hand and the great company of followers of conventionality on the other. And this fight will continue after him, as it existed before; for the mass of humanity will always adhere to fashion in thought and action, and even in science, as well as in dress. The healing profession is by no means free from this universal trait of average men, though probably more so than ever before in its history.

Yet those who still feel its blighting discouragement, may take comfort in the thought, if comfort it be, that even their own little truth may take the wings of a fad after their death and become the cult of a new generation of worshippers of things that are both new and fashionable.

But if Dr. Newman's personality reached the steadfastness of an enthusiast it evinced no less a geniality peculiarly his own, and no one who has attended the numerous executive meetings of Association workers at his home can forget the hospitality that attended his ceaseless work for this body.

The future history of urethral stricture will always contain an important landmark, in the name of Dr. Robert Newman.

G. B. M.

Progress in Physical Therapeutics.

CONSTITUTIONAL DISEASES.

EDITED BY FRANCIS B. BISHOP, M. D.

Does the Action of Ozone Upon a Solution of Starch Produce the Characteristic Iodine Reaction?

Dr. Geyser at the meeting of the Electro-therapeutic Association (in the interest of science) attacked the results of one of my experiments by saying that the particles of blue found in my bottle- electrode, in which was sealed a solution of starch, did not result from the iodine being carried through the glass by the high-frequency currents while the electrode was being used with iodine on the outside, but was the result of the discharge of ozone in the bottle, and further stated that ozone would produce the blue reaction in starch. I was not in a position at the time to answer his criticism, but have since my return conducted some experiments. All with the same result. The last one I will give in full.

My cook prepared me a basin of starch, such as is used by a laundress. From this were selected three samples. Each sample placed in a small fruit dish. In one of the dishes was placed a teaspoonful of the saturated solution of iodide of potash. In the other two dishes no iodide. One of the dishes with no iodide in it was left out of the room in which the experiment was to be tried. The two other dishes, one with and the other without iodide of potash, were placed three feet apart and in each dish a perfectly clean bottle electrode, containing only clean water, was placed. These electrodes were attached by cords to each side of my high-frequency coil. The current was turned on full capacity and allowed to discharge ozone into the dish for half an hour. The three dishes were then examined and fully compared. The dish containing the iodide was the only one showing the blue reaction. Will Dr. Geyser tell us how to get this iodine reaction in starch without the iodine?

F. B. B.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Laryngeal Tuberculosis.

An examination of the larynx in tuberculous subjects is not usually made by the physician unless the patient complains of symptoms referable to that region. When this is the case the lesions are usually so far advanced that a successful treatment is very difficult or even hopeless.

The surgical treatment of laryngeal tuberculosis as advocated by Kronenberg (*Muenchner Med. Wochenschrift*; *Journal American Medical Association*, May 23, 1903) there is a certainty or probability of removing the entire focus. Laryngotomy is indicated only in exceptional cases. The standard procedure is by way of the mouth. If complete ablation is possible, he would operate only as indicated by threatening complications or to eliminate what interferes with other therapeutic measures. None of the remedies recommended for the purpose has a specific action; galvano-cauterization is the most effectual yet known. The physician's important task is to strive for spontaneous healing. This is best accomplished by careful general treatment along the approved lines to enhance the natural existing powers of the organism, supplemented by local treatment. Unfortunately, he remarks, the majority of patients with laryngeal tuberculosis are poor, and the physical and dietetic measures required are seldom to be procured. Curable cases should be sent to a sanatorium or its equivalent, but the German sanatoria object to receiving tuberculous patients with laryngeal complications.

Kronenberg has witnessed a few cases in which a moderately severe tuberculosis of the lungs and larynx healed completely in time. One of his cured patients had been rejected by the sanatoria as incurable; he was a particularly intelligent man, who co-operated with the physician in every way.

Cancer of the Lip.

Cancer of the lip is much more frequent in men than in women for the reason that the pipe is chiefly the exciting cause. The lower lip is usually the location. It is rare under forty, and the position in life seems to have something to do with its existence. (Stoker, *The Practitioner*, London; *Jour. Amer. Med. Ass'n.*, May 30, 1903.) The well-to-do classes seldom smoke clay pipes and rarely suffer from the disease in this situation. Its progress is definite and regular if unchecked; it is always a squamous-celled epithelioma. The operation is a simple one; he objects to any special attention

to cosmetic considerations, the more elaborate the operation the more likely the recurrence. The prognosis is extremely good even in severe cases if the operation is thorough.

RADIOTHERAPY.

EDITED BY J. D. GIBSON, M. D.

Some Clinical Chest Cases with Fluoroscopic Reports. By C. Miner Cooper, M. D., Ch. B., M. R.

F. J. J., boiler-maker by trade, marked alcoholic, but no syphilitic history, has had lead poisoning and gonorrhea. He was admitted in May, 1902, and found to be suffering from a large aneurism of the thoracic arch.

He is an excellent example of the truth of Broadbent's remark that "the aneurism of physical signs springs from the ascending portion of the aorta, the aneurism of symptoms from the transverse arch." Notwithstanding the large size of this growth, of the presence of a well-marked, visible, and palpable expansile pulsation, of a diastolic shock of systolic and diastolic murmurs, there was no shortness of breath, no cough, metallic or otherwise, no inequality of the pulses, no relaxation of the vocal cord, no difficulty in swallowing. He had two symptoms, however, often common to aneurism, wherever situated: (a) A sense of throbbing; (b) pain. This pain, which was the cause of his entering the hospital, was very intense, constant, and situated in the right mammary region. Potassium iodide, in large doses, failed to afford any alleviation, and morphine injections had to be resorted to. It is gratifying and instructive to be able to report that three exposures to the X-ray, on alternate days, each exposure lasting five minutes, entirely relieved his pain. The analgesic power of the X-ray in malignant growths and other painful conditions has been noted for some time, and suggested its trial in this case:

Assistance is given by the fluoroscope in differentiating between cardiac and aortic enlargements. It is impossible by the common modes of examination to determine whether a dull area, is cardiac or aortic, since there is no delimitation between the cardiac and aortic dullness. The fluoroscope, however, showed the right border of the heart above the diaphragm for about one and one-fourth inch; above this, either the heart is included in the aneurism, or the aneurism has overlapped the upper part of the right heart border, thus preventing a differentiation of shadows. I believe it is the latter, as (a) the right margin of the shadow does not move in respiration, though the left border of the heart does; and (b) though the heart reflex, as described by Abrams, causes dis-

tinct shrinking of the left heart, no change of this outline takes place. Attention to these two points will often aid us in interpreting correctly fluoroscopic shadows.

The transverse position of the heart is sometimes seen in aneurisms, and has been especially noted by Walsham as being of diagnostic value in doubtful aneurism cases.

I have photographed and treated therapeutically this man for the last year at different intervals, and have watched, with the fluoroscope, the monthly progress of the aneurism. At first, I always used a grounded aluminum screen. The last time I fluoroscoped him was two days previous to his leaving the hospital for a few weeks. On his way to my office he had become intimately acquainted with Bacchus. Being afraid I might not see him again for some time, I fluoroscoped him while in that condition, the time of his exposure to the ray being certainly, at the widest limit, not five minutes. I used no screen, as previous experiences seemed to warrant him free from any personal idiosyncrasy. The same apparatus (coil-Muller tube) had been used on him before in the same way (and for a much longer time, as I had demonstrated him to the students) without any ill effect. Three weeks later, he returned to the hospital, with a typical X-ray burn six inches by seven between the shoulder-blades. The burn was of the first and second degree; the redness, itching, and tender spots were typical. The itching and burning sensations were first felt seventeen days after the exposure. The burn has immensely improved under the application of zinc ointment, and, if it were not for the history of other X-ray burns, I should say it would soon trouble him no more.

HYDROTHERAPY.

EDITED BY CURRAN POPE, M. D.

Gastric Crises.

Professor Ewald, of the Medical Department of the Royal University of Berlin, has recently written an interesting paper on the subject of gastric crises. These crises are associated with various maladies, particularly neurasthenia, hysteria, and various nervous disorders of the liver, kidneys, and gall bladder, of which the crises is a reflex symptom, and especially of locomotor ataxia.

In the latter disease the crises make their appearance before the taxia symptoms appear. Professor Ewald considers gastric crises in locomotor ataxia to be due to auto-intoxication, the result of a toxin which, while having no influence upon normal nerves, produces painful impressions in nerves which are impaired by disease. Ewald knows of no medicinal agent which is capable of cutting short an attack of gas-

tric crises except morphia, and the use of this is dangerous, as the patient will soon acquire the habit.

Professor Ewald, possibly, has not made a trial of hydriatic applications. Fomentations afford considerable relief in these cases, although the attack may not be aborted or the painful symptoms entirely controlled. The application of radiant heat is a still more efficient measure, and in some instances the passage of a stomach tube and irrigation with water at a temperature of 110° to 115° are measures which afford very great relief.

The most important measures are those of a preventive character. As the disease is due to a toxin, it is clear that the prevention of the formation of this toxin will prevent the occurrence of the crises. This may be best accomplished by regulation of diet, as the toxin is more probably generated in the alimentary canal. The withholding of flesh foods is a measure of the first importance, for reason that fragments of undigested meat remaining for twenty-four or forty-eight hours in the colon undergo putrefaction, and give rise to products of a most highly toxic character. Coarse vegetables should be avoided for the same reason. The indigestible cellulose in which coarse vegetables abound often causes too long retention of food substances in the stomach, and resulting fermentation, and even putrefaction. In the colon both fermentation and putrefaction occur, and the toxins resulting are of course absorbed into the blood, and give rise to gastric crises as well as to headache and other nervous symptoms.

Ewald's suggestion that relief may be obtained by injecting a grain and a half of cocain into the intradural space of the spinal cord is not likely to be very generally adopted, although the distress from this disorder is sometimes so great as to make a patient willing to submit to any kind of treatment which will afford even temporary relief. J. H. K.

What Saline Infusions can Accomplish,

Ercklentz (*Zeitschrift f. klin. Med.*, Berlin) inoculated rabbits with staphylococci or injected analin, arsenic, ricin, or cantharidin, and then injected large amounts of a .7 or .9 per cent. saline solution. When copious diuresis was induced the poison was eliminated more rapidly, but it was not invariably induced, probably owing to the different diffusion of the various substances through membranes, but chiefly to the behavior of the kidneys. When the latter were injured by the effects of the intoxication they were unable to respond to the saline infusion with increased diuresis. The kidneys of the animals that succumbed to the intoxication were always more pathologic than those of the rabbits that survived. His clinical experience was also favorable. He thinks there is a wide

field for "continuous infusion;" that is, repeated injections. In one case of very severe anemia he made fourteen infusions of 800 to 1200 c. c. each in the course of a month as the last resort. The patient gained fifteen pounds, and the erythrocytes rose from 710,000 to 1,240,000; the Hb. from 2.3 to 5.3 per cent.—*Jour. A. M. A.*, June 20, 1903.

Hyperchlorhydria.

Hemmeter (*International Medical Magazine*, June) recognizes two classes of this affection: 1. Those of the neurotic type in which there is a preponderance of nervous symptoms and fragments of the mucosa show no increase in the number of gland tubules or in the oxyntic or acid cells. 2. Those where there is an increase in the number of gland tubules or in the oxyntic cells. There is no sharp line between these two, but they require somewhat different treatment. In some cases the hyperacidity may be kept up by a proteid diet, though the latter may relieve the annoying symptoms for a time. If this relief is very brief, however, and the indican increases, then he advises a diet rich in carbohydrates and fats. All cases of hyperacidity require a certain amount of carbohydrates. In case of ulcer the diet must be as little irritating as possible.

In the writer's experience nine cases out of ten with this trouble have been greatly benefited by the application of hydrotherapy, which has for its action the arousing and awakening of every cell and bodily function and that its proper application is corrective of the diseases would be doubted by one who has never tested its efficacy.

SOCIETY MEETINGS.

AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION. THIRTEENTH ANNUAL MEETING.

Held in Atlantic City, N. J., September 22, 23, and 24, 1903. Daniel R. Brower, M. D., of Chicago, President.

FIRST DAY.—TUESDAY, SEPTEMBER 22. MORNING SESSION.

The Association met in the Hotel Windsor, Atlantic City, N. J., and it was called to order by the President, Dr. Daniel R. Brower, of Chicago, at 9.10 A. M.

The minutes of the last annual meeting were read by the Secretary, and, on motion of Dr T. D. Crothers, they were adopted.

The report of the Executive Committee was read by the Secretary, and action was taken thereon seriatim, as follows:

A proposed amendment of the by-laws whereby the power

of electing candidates for membership should be vested in the executive council was laid over for one year, under the rules.

On motion of Dr. W. J. Herdman, seconded by Dr. Crothers, the recommendation that certificates of membership should be procured was unanimously approved.

With regard to the question of an admission fee, on motion of Dr. W. B. Snow, seconded by Dr. Crothers, By-law No. 57, bearing on this matter, was suspended by a rising vote, Drs. Herdman and Rockwell objecting.

The following were elected separately and unanimously to membership in the Association: Drs. J. H. Burch, W. J. Tindall, J. N. Leibermann, B. S. Prince, W. R. Lough Klingensmith, George C. Johnston, Lewis M. Early, M. W. Brinkman, Henry H. Cook, Charles N. Bibbins, A. R. Ranier, J. N. Scott, Ernest G. Cauley, Albert E. Sterns, Amadee Granger, M. K. Kassabian, Wolff Freudenthal, J. H. Stewart, Charles H. Shepard, John T. Pitkin.

Thomas F. Livingston and Henry E. Waite, Sr., were recommended for associate members, and were elected.

Dr. C. R. Dickson objected to the admission of manufacturers.

On motion of Dr. W. B. Snow it was decided to reconsider this vote, although Dr. Snow declared at the time of making the motion that he, personally, was in favor of electing these gentlemen to membership.

Dr. G. Betton Massey said he saw no objection to the admission of manufacturers who were personally agreeable to the members, and whose admission to membership might be mutually profitable.

Dr. F. B. Bishop said that in previous discussions he had favored the exclusion of manufacturers, but he was now willing to admit that this was an error because by so doing the members living at a distance from large medical centers had been deprived of a great deal of profitable fellowship.

Dr. A. C. Geyser did not see that the ethical standing of the association was impaired so long as a strict dividing line was held between active and associate members. Such rapid advances were being made in the manufacturing department that the medical members could not otherwise be kept fully informed.

Dr. Snow said that while he was in favor of admitting proper manufacturers to associate membership, he saw no reason why they should not be required to pay the usual fee.

Dr. W. W. Eaton said he had voted for reconsideration in order to hear all the arguments, but, nevertheless, he felt that proper persons from among the manufacturers should be admitted. He also indorsed the suggestion that they should pay the fee.

Dr. M. A. Cleaves thought it was a mistake to admit

manufacturers to this association, and she recalled the earnest discussion in the past supporting that position. She felt that this would introduce an element of discord.

Dr. Dickson said he was decidedly opposed to the admission of manufacturers to associate membership. For example, Dr. Waite, being a graduate of an eclectic college, could not come in as an active member, but, by the action proposed, could be accepted as an associate member.

Dr. Snow moved to lay these names on the table for one year. Seconded by Dr. Dickson, and carried by a rising vote.

Dr. W. Blair Stewart, of Atlantic City, Chairman of the Committee of Arrangements, reported verbally for his committee as follows:

"You are heartily welcome to Atlantic City, and your committee of arrangements has acted in conjunction with Dr. Newman. The committee deemed it wise not to attempt to have a regular exhibit at this time because there was no suitable room at the Hotel Windsor, and it did not seem desirable to locate such an exhibit at some distance from the place of meeting. Atlantic City is such a cosmopolitan place and your programme is so full that it was not thought wise to have many excursions or entertainments. Dr. Newman was especially anxious that a drill be given by the crew of the life-saving station. This drill will take place to-day at 2 P. M., at Vermont Avenue and the boardwalk.

"On Wednesday morning at ten o'clock there will be a lecture given at the signal station, another matter which Dr. Newman was very anxious to have arranged for this meeting. This lecture will be held at the corner of Rhode Island Avenue and Pacific Avenue.

"On Wednesday evening at nine o'clock the entire profession of Atlantic City and the ladies will be present in this hotel to meet the members of this association with their wives and ladies. We wish to make this a strictly informal affair in order that we may meet one another socially and intimately.

"With regard to the various points of interest about Atlantic City, I would say that those who are interested in hospital work will be only too welcome to the Atlantic City Hospital located on Ohio Avenue. The doors will be open to the profession at any time. The two piers are now open, and will be found very attractive. The boardwalk you are probably already familiar with. The trip to the inlet, at the upper end of the trolley line, and the trip to Longport, at the lower end of the trolley line, are both interesting, and show you the island from one end to the other. Starting from the inlet the avenues are named after the principal States, beginning with the New England States at the upper end, and ending

with the Southern and Western States at the lower end. The bus rate is ten cents for the first ten squares, and five cents thereafter. The management of the hotel has expressed its willingness to make the members comfortable in every way possible.

"With regard to Atlantic City as a health resort, let me say if you wish to send your neurasthenic or convalescent patients here this should be done either in the spring or fall. The island is crowded, and the place is one of excitement in July and August, although certain forms of illness will be benefited even in those months. In conclusion, let me express the hope that before you leave here we may all know one another well."

The President: Fellows of the Association. I have the honor and great pleasure to introduce to you Hon. Franklin P. Stoy, Mayor of Atlantic City, who will now address you.

Mayor Stoy. Mr. Chairman, Ladies and Gentlemen: I did not forget my engagement at the hotel here this morning, but I was detained at another large convention. I am glad to be here this morning to extend to you a welcome, and to express the hope that your coming may be a benefit, not only to you but to our own people. I have listened with pleasure to Dr. Stewart's instructions as to how you can best get about the city, and I am not sure just what is his reason for doing this. We generally extend the freedom of the city to such visitors as you. We know that many of you are unaccompanied by ladies, and that you intend to be good citizens. It is needless to say that the department of public safety has been notified that you are here. If anything is needed from that department let me say you have only to make the want known. Let me extend to you all the freedom that we have in this city. We have here a place at all times for a convention such as this, and we hope you will enjoy yourselves. When leaving here do not forget that the latchstring of Atlantic City hangs outside.

The President: To make the bond of fellowship between us stronger, and to make your promises stronger, I take pleasure in handing you this badge, and making you, for the time being, an honorary member. I shall now call upon Dr. C. R. Dickson to respond to the address of welcome of the Mayor.

Dr. Dickson: On behalf of the American Electro-therapeutic Association it is my pleasant privilege to thank you for the kind manner in which you have welcomed us to your city. I am sure I voice the feelings of this association when I say that we are all delighted to be with you, and that we feel perfectly safe after learning that the police have been notified not to molest all wearing our badge, and that an ambulance has been placed ready at hand. We have been accustomed to think that Atlantic City is an all-the-year-round re-

sort, and we are pleased to learn from Dr. Stewart that at certain seasons, for invalids at least, it is better than the best. There is certainly no difficulty in enjoying one's self because all that it is necessary to do, on arriving here, is to go to the boardwalk.

This association has come to you under a cloud. We had hoped that one whom we have loved would be with us to marshal us around, but the Almighty has decided otherwise. We must not, however, allow this sadness to plunge our meeting into gloom because we know that he who was expected to respond to your welcome would not have us do so. We are much indebted to you for your welcome, and for extending to us the freedom of your city.

On motion of Dr. G. Betton Massey, Dr. Walling, Dr. Marks, of Reading, Dr. H. P. Pratt, of Chicago, Dr. Stuart, of Minneapolis, Dr. Linn, of Rochester, and other members of the medical profession from Atlantic City and elsewhere were invited to participate in the scientific proceedings of the association.

A letter was read from Mrs. Newman, wishing the association a most successful meeting, and requesting that the paper of Dr. Newman be read by Dr. William Stevens, or, in his absence, by Dr. C. R. Dickson.

On motion, the executive session adjourned at 10.25 A. M. and the scientific programme was taken up.

Dr. Daniel R. Brower, of Chicago, delivered the Presidential Address.

Dr. W. J. Herdman, Ann Arbor: All of us must have noted some of the admirable and important suggestions contained in this address. I, therefore, move that a committee be appointed, of which the Secretary shall be the chairman, and consisting of Dr. F. B. Bishop and Dr. F. H. Morse as his associate, this committee to consider the recommendations contained in the president's address and report at the next meeting. Seconded and carried.

Dr. G. Betton Massey, of Philadelphia, presented a communication concerning the death of Dr. Robert Newman. (This appears elsewhere in this issue.)

The President: I think we can well afford to spend a short time in speaking on this sad topic.

Dr. C. R. Dickson, Toronto: I move that the association, having heard with sincere regret of the death of Dr. Robert Newman, desires to place on record its feelings on this occasion, and its indebtedness to him for his work for the association as well as for the science of electro-therapeutics. I also move that the President be requested to name a committee to draft suitable resolutions concerning his death, and transmit them to the family, and further that, as a mark of respect, this association adjourn for a time.

I cannot trust myself to speak at length with regard to Dr. Newman, because we were inseparably connected for the past twenty years. It was my privilege to know him as a friend who was unwavering. His life was given to electro-therapy. His life was brave; his death was likewise brave. When he should have been in bed he was up and attending to his patients. Four weeks before his death on August 28, he was suffering severely from gout. Two weeks before his death dysentery set in, and although strongly advised by physicians to go to bed, he was too proud to yield. It was no doubt very much against his will that he left New York City and went to Monument Beach for the summer. I am told that up to four days before his death he was engaged in correspondence with regard to the present meeting of this association. So much did his spirit and indomitable will uphold him, that to the very day of his death he was in active practice. He had expressed a wish to die in the harness, and he did die in the harness. Although his family strongly urged him not to go downstairs on the day of his death, he came down to his office. One of his lady patients even insisted that he should not treat her because of his condition, but he would not listen to this, and persisted in giving the treatment. He collapsed while doing this, but would not even then lie down, but remained in his chair, and was revived. That very night he sat in his static chair, and there died. Truly this was dying in the harness. I wish to add this tribute to his memory.

Dr. C. O. Files seconded the motion to appoint the committee, and the motion was carried. The President appointed on this committee, Drs. C. R. Dickson, G. Betton Massey, and Fred H. Morse, and the committee was requested to report as soon as possible to a subsequent session of the association.

Dr. Byron C. Pennington, President of the Atlantic City Academy of Medicine, was then introduced, and spoke as follows:

In the name of the Academy of Medicine, and as president of that body, I may say that it gives me great pleasure to see you here, and anything that we can do to help you in your business or in your pleasures it will give us great pleasure to do. I see many familiar faces here, and believe that many of you are familiar with our city, and know how to enjoy yourselves even so late as this in the season.

Fifteen or twenty years ago when Apostoli was making such extraordinary claims for the curative power of the current, I, like many others, interested myself in this work. After three or four years I gave it up, but I must admit that we are all reaching out for something more curative than drugs, and I believe that by long odds electro-therapy heads the list of the promising curative agents. Advances in this field have

been many and important, and it is now more a science than the fad it used to be.

You probably know that Atlantic City is coming to be a very great convention city; there are no less than two conventions besides your own here at the present time, and next week we very properly close the season by the convention of the National Association of Undertakers.

Dr. W. J. Herdman was called upon to reply. He said:

As the doctor made some confessions in the course of his remarks I was reminded of the couplet of the old hymn,

"As long as the lamp holds out to burn
The dying sinner may return."

There is hope even for a backslider in electro-therapeutics if he will only attend our meetings faithfully. I think we can assure him that by means of properly equipped and properly handled electro-therapeutic appliances in his office he will be able to do a great deal. I say this in response to what he has said, and because we come to this community hoping to do it good. We naturally wish the Atlantic City Academy of Medicine to get the most benefit, and we have no secrets that we are not willing to impart. We wish while we are here, sir, to return to the sea, sir, the things which are the sea's, sir. I have no doubt that some will do this during their stay here. I have always been very sensitive in such matters. I know that I did on a previous occasion when tempted to try some of the craft here. Even in my early youth I did not dare to look at a young woman who wore a sailor hat.

We have been invited to see the life-saving institution, and also the life-taking institution—the hospital. I am afraid that on attempting to pursue the strait and narrow ways—which lead to the boardwalk, that the members will need the services of the extra police force provided for this occasion. Our hosts have been exceedingly considerate in providing these things, and also in so arranging the meetings of the various conventions that the undertakers follow the doctors. Our hosts must not expect too much of us, for we are human, and although we are *advanced therapists* we have not reached a state of perfection—indeed, I feel like expressing the wish of the old colored woman who, having passed through some questionable experiences in life finally "got religion," and wished to be baptized. The old brother who had this duty in charge, knowing her past life, took her into the deepest part of the pool and said: "Now, mammie, I am going to dip you down deep, and when you comes up you will be whiter than snow." To this mammie replied: "Massa, that's asking too much; cream color will do for me."

There being no objection, the regular programme was then resumed.

Dr. Margaret A. Cleaves said that she had no report to make for the Committee on Induction Coils and Alternators, and that the committee had not made a report for several years.

Mr. R. G. Brown presented a report for the committee on electrodes, exhibiting several electrodes.

MEETING OF THE CLINICAL SOCIETY OF THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

Stated Meeting September 18, 1903. William Benham Snow, M. D., in the Chair.

Selective Harmonic Electric Vibration. A New Therapeutic Modality, with Demonstration of Apparatus. Dr. Morris W. Brinkman presented this paper.

Discussion.

Mr. R. G. Brown: As I understand it, the author gets out of the coil three distinct rates of vibration. I am reminded in a way of the harmonic telegraph. This telegraph is made up of three tuning-forks, as, for example, in New York, and the same number in Boston. There would be only one wire between the two cities. The operator using a fork vibrating, say, 200 times per second, would send that number of vibrations over the wire, and only the fork which vibrates at that rate will respond, although the current is passed through all three forks. Similarly, messages can be sent over the other forks, each fork picking up its own rate of vibration.

I wish Dr. Brinkman would demonstrate the apparatus before discussion.

Dr. Brinkman: The vibrator is one constructed with a ribbon instead of the usual spring. The ribbons are arranged in such a way that the tension and the rate of vibration can be changed. It is remarkable how closely the human ear is capable of tuning an instrument of this kind and securing the proper vibration. I stated in the paper that a muscle is an ensheathed mass of protoplasm, composed of bundles of fibers, which, in turn, are composed of ultimate fibrillæ. It can hardly be assumed that the fibrillæ are all of exactly the same length, thickness, and tension. If, therefore, they respond in proportion to a particular rate, the ones attuned to a particular note will contract, and the rest of the muscle will be dormant. If a larger collection of single filaments are actuated by varying rates of vibration, there will be naturally a much more extensive contraction of the muscle. A musical chord is formed, and the wave lengths of the dif-

ferent rates and pitches are different. If they interfere, we have silence, but they do not do so here because in that event they would not be harmonic. I think that you will admit that a multiple harmonic vibration will more thoroughly contract a muscle than a single note. I have made a number of experiments to determine the nature of the material of which the vibrating spring should be composed. Thirty or forty of these ribbons have been made, and their exact dimensions have been determined by a micrometer. I should like to hear the opinions of those present regarding the electrical and the electro-physiological position which I have taken.

We have in this instrument three windings, 500, 1000, and 2500 feet. The potential is the same at the primary, but I claim that there are three separate secondary currents produced. We have rates, we will say, of 200, 300, and 400, although, in reality, they are much higher. These three distinct secondary currents traverse a muscle not exactly, but practically, at the same time. I am desirous of making an apparatus which will give me a much larger range of choice. At present I have an instrument which comprises three octaves. The instrument as mounted here for this demonstration is very unsatisfactory, because the mounting is unsteady and there are various confusing and sympathetic vibrations produced as a result of this. In my own office I have the instrument bolted down upon a slate base so that such vibrations are practically avoided.

Mr. Brown: I am disposed to think that the current produced by this instrument is of the nature of the sinusoidal current.

Dr. Arnold Snow: Do you find any relation existing therapeutically between the contraction of a certain muscle of a given length with the harmonic used; in other words, do you find that the longer muscles contract more fully with a harmonic of low tone than with one of higher tone?

Dr. Brinkman: That is a question for the physicists. It is known that long bodies under low tension vibrate slowly. I cannot say that I have observed a particular rate to a certain muscle, but I have observed that a single muscle will respond very differently, depending upon whether I have one, two, or three of these vibrators in action. To a certain extent I have noticed a difference in response of the length of the muscle as compared with the pitch of the note, but it will require a long series of accurate measurements to give us definite information on this point. The question just asked is most interesting and suggestive.

Dr. Tracy: This subject is so new to me that I do not feel prepared to speak at length upon it. I think a good deal of experimentation must be undertaken before we can determine whether this harmonic device possesses any special value in

the treatment of disease. It will be interesting to determine how the dominant cord or subdominant may possibly be found especially valuable in the treatment of particular forms of disease. The demonstration just made is certainly very interesting and suggestive.

Dr. W. B. Snow: It seems to me that this apparatus offers us one opportunity which perhaps we have not had previously of studying the relative merits of rates of vibration as well as of the combination of different rates, because here we have known rates to work with. In connection with this, we should heed also the varying potentials. To me, the potential produces great variation in the therapeutic effect. For instance, if we are using a current of a certain potential we do not get the same therapeutic result that we would if we made use of a higher potential. We are employing high frequencies with our static machines and our coils without any adequate notion of what those rates of vibration are. They are far beyond the rates of vibration that can be determined by the musical scale. It is possible that this harmonic arrangement will prove a stepping-stone to that which is so far beyond. Vibration, I believe, is a vast subject full of numerous and interesting complications throughout all nature. We should, in this new field, determine not only the musical note, but also the potential. As I understand it, the musical note may remain the same with variations in potential under varying conditions, does it not, Dr. Brinkman?

Dr. Brinkman: I think not. Any variation in quantity of current flowing through the apparatus will affect the magnetic quality of that primary, and cause a variation in the oscillation rating of the spring, and hence we produce a difference in the musical note. I believe that the quantity of output that goes through the primary with the street current is practically fixed, because the primary is practically saturated all the time, although as the primary heats up there will be some variation in the current flowing through the primary. If the current in the primary remains fixed, then the secondary current must also remain fixed. I believe, with the last speaker, that the conditions he lays down must be observed, and to that I would add, the nature of the electrodes employed. With a sponge one can never tell what the patient is receiving unless a meter or some other means of measuring the current is employed.

Dr. Snow: The static current is one method of applying mechanical vibration, with the added effect of polarization of tissue. We must learn to discriminate in the choice of rates of vibration as well as of potential. The problem is difficult, but one which should prove of great value.

Dr. Brinkman: I am very thankful to those who have taken part in this discussion. The value of a discussion is especially great to the writer of the paper when he receives a good solid

pounding. The question as to whether long muscles are influenced in a certain way by low pitched harmonic chords is exceedingly important. Unless we have a system of tuning-forks with the correct rates of vibration stamped upon them, and use them under certain definite conditions on clinical cases, and note the result, we cannot lay down any general rules. I have taken the sensitive middle turbinate and have given a treatment from the cilio-spinal ganglia to the middle turbinate with this current, and with the best results. The middle has very serious connections with the intracerebral circulation, and many of us know what severe headaches and various congestive conditions arise from diseased states of the middle turbinate. By means of this current I have given immediate, though temporary, relief, and after several applications have made my patients practically well. I can vouch for the facts, even though some may choose to explain them as mere coincidences. I had a boy with double paraplegia who gave no response with any current except the one under discussion this evening. In that particular case, with the means for interrupting the current slowly so that the muscle had a chance to recover itself and re-contract, I have been enabled to give muscle exercises. I know of no other method by which I could accomplish this in this particular case.

Dr. Charles O. Files, of Portland, Me.: Have you observed different therapeutic effects from different chords or rates of vibration?

Dr. Brinkman; I used this current on a singer whose nose had given me a great deal of trouble from a relaxation of the intra-nasal tissues, with consequent oedema. This current gave great relief and, I believe, a cure has been effected. In this patient experience showed that the current produced by the notes C, E, G acted best, and was most easily tolerated. On the other hand, certain other notes caused sneezing. I think this answers the question of Dr. Files. When the instrument is adjusted so as to give a discordant note the ribbons seem to interfere with one another, and do not work properly.

Demonstrations of High Frequency Apparatus.

Dr. Brinkman: I wish now to show you a high frequency coil. At my suggestion a coil has been constructed by the Wappler Controller Company, so that the condition of the secondary can be regulated to a nicety. The great problem with all coils is to get a rate of interruption which will be practically uniform and of equal capacity. We are using in this instrument an electrolytic interrupter, and the rate of interruption is influenced by the size of the hole and the conductivity of the bubbles of gas. As you see, we can regulate the action

of the coil very nicely by withdrawing the primary coil to a greater or less extent.

I wish also to show you a new step-up transformer also made by the Wappler Co. for high frequency effects.

I next wish to show you several electrodes. One of them is filled with mercury and the contact is made by means of ground carbon through the metal at the rear. One tube contained graphite, and another ground carbon of a certain degree of fineness, and still another was a close-grained carbon rod. The resistance made to the passage of the current, as delivered within, is found to vary with the thickness of the glass and the character of the contents. You can determine roughly the amount of current flowing by the length of the section when a maple rod electrode is employed. Care should be taken that the length of the rod employed should not be cut down so as to approximate the length of the sparks of the coil, as under such circumstances a spark is very apt to pass to the patient—an exceedingly unpleasant accident. I wish to state here that a certain observer has noted a rise of temperature of from two to two and a half degrees by the clinical thermometer as a result of passing the current for five to ten minutes. The current is of larger quantity and lower voltage, and gives more chemical effect than the low tension coil current. This also generates ultra-violet rays, as has been demonstrated by the well known tests.

Dr. Snow then demonstrated static wooden and vacuum electrodes, he said: I find the wooden electrodes most valuable for treatment over the surface of the body, while in the cavities of the body I prefer to make use of the glass electrodes. The sets of electrodes usually provided with the machine have too small handles. I prefer to make use of a three-quarter inch handle. With a long handle there is less danger of the passage of a spark while giving the treatment. For the same reason the operator should be careful to keep his hand high and at a distance from the patient. If maple is used it is not the red part, but the white part that should be employed for the electrode. The sticks should be green and when they become dry may be placed in the cellar where they will gather moisture slowly. I have adopted a variety of terminals for use with these electrodes. The wooden ball terminal gives off a discharge rich in volume which is exceedingly useful in the treatment of conditions of congestion and inflammation capable of affecting deep structures. It is really wonderful to one who is not familiar with this treatment to see how inflammatory swelling, as in a case of sprain, will disappear under applications of this static modality. The itching of eczema will often disappear after one application. The discharge is not nearly so irritating as the discharge from the glass electrodes used in connection with either the static machine or coil and is more effective.

Whenever the patient is connected to the positive pole of the machine the effect is irritating. The current should therefore, always be taken from the negative side. The negative discharge is always a clear violet color, whereas that from the positive contains whitish streams of light.

The vacuum electrodes made by E. Machlett & Son were also exhibited.

BOOK REVIEWS.

SCHRME FOR THE DIFFERENTIAL TESTING OF NERVES AND MUSCLES FOR USE IN DIAGNOSIS. By J. MONTGOMERY MOSHER, A. M., M. D., Clinical Professor of Insanity, Neurology and Electro-therapeutics, Albany Medical College; Attending Specialist in Mental Diseases and Physician to the Out-patient Department for Nervous and Mental Diseases, Albany Hospital. Illustrated. Albany, N. Y., Brandow Printing Company, Fort Orange Press. 1903.

This volume has been prepared for the purpose of facilitating electro-diagnosis and shows a degree of familiarity and knowledge of the technique which commend it for the purpose for which it is designed. The unique feature of the work consists in the classification of the nerve and muscle groups, which commends itself to those familiar with the subject. The work comprehends the use of the continuous and interrupted modalities in their relations to the various actions normal and of degeneration in accordance with the well-established laws. The writer's method of presenting the subject is clear and ingenious. Six full page plates showing the various motor points will assist the student in the study of the subject. We commend the work as one well-calculated to meet the demands as a text-book upon the subject, and congratulate the publishers upon the appearance of the work.

A DICTIONARY OF MEDICAL SCIENCE. Containing a full explanation of the various subjects and terms of Anatomy, Physiology, Medical Chemistry, Pharmacy, Pharmacology, Therapeutics, Medicine, Hygiene, Dietetics, Bacteriology, Surgery, Ophthalmology, Otology, Laryngology, Dermatology, Gynecology, Obstetrics, Pediatrics, Medical Jurisprudence, Dentistry, Veterinary Science, etc., by ROBLEY DUNGLISON, M. D., LL.D., Late Professor of Institutes of Medicine in the Jefferson Medical College of Philadelphia. New (twenty-third) edition, thoroughly revised, with the pronunciation, accentuation and derivation of the terms, by THOMAS L. STEDMAN, A. M., M. D., Member of the New York Academy of Medicine. In one magnificent imperial octavo volume of 1224 pages, with about 600 illustrations, including 85 full-page plates, mostly in colors, with thumb-letter index. Cloth, \$8.00, net; leather, \$9.00, net; half-morocco, \$9.50 net. Lea Brothers & Co., Philadelphia and New York.

This most excellent work should find a place in every physician's library for it supplies a need which this twenty-third edition guarantees.

A noticable feature of the work is detail, as fulness of explanation, most complete and concise definitions, accentuation, and attention to synonyms. Each important subject is exhaustively but concisely presented. Another point of great

value is the well defined cuts and illustrations which are from leading authorities, as Testut, Gerrish, etc. It is "an epitome of the existing condition of medical science" being modern in thought, feeling, and expression.

Dr. Stedman is to be congratulated on the finished revision not only in respect to its literary value but also on the splendid style in which Lea Bros. & Co., the publishers, have done their work which adds to its ornamentality and usefulness.

A COMPEND OF DISEASES OF THE SKIN. By JAY F. SCHAMBERG, A. B., M. D., Professor of Diseases of the Skin, Philadelphia Polyclinic and College for Graduates in Medicine; Fellow of the College of Physicians of Philadelphia. Third Edition, Revised and Enlarged with 100 illustrations. Philadelphia, P. Blakiston's Son & Co., 1012 Walnut Street. 1903. Price 80 cents net.

This little book well meets the author's intentions to present the subject of skin diseases in a "succinct, lucid, and readable form." It will be found a handy work in the hands of the general practitioner who has not time to devote to the larger volumes devoted to the subject. It is up-to-date and the publication of the third edition is a guarantee of the cordial reception it has received. We commend the work for the purpose for which it was designed.

STATIC ELECTRICITY X-RAY AND ELECTRO-VIBRATION THEIR THERAPEUTIC APPLICATION. By FRANKLIN B. GOTTSCHALK, M. D., Professor of Diseases of Children, at Jenner Medical College, Attending Physician, German-American Hospital, etc. Published by T. Eisele, 906 Evanston Avenue, Chicago, Ill.

This little volume of 180 pages is quite elementary. It offers itself however, to the beginner for what it says about the care of a static machine. To cover so large a field as the present status of electro-physics in so small a volume is of course impossible. The volume nevertheless gives considerable information and the time and trouble of the reader will be repaid in obtaining useful information from it. We take exception to the following statement: "The fluoroscope is of more service and practical value in X-ray work than skiagrams." We have not found this to be the case. The fluoroscopic pictures very often invite errors, the skiagram rarely so, and never if it is interpreted correctly. We thoroughly agree with the author that "by the application of the principles here laid down (meaning this volume) results may be obtained which appear marvelous to one not familiar with their application."—

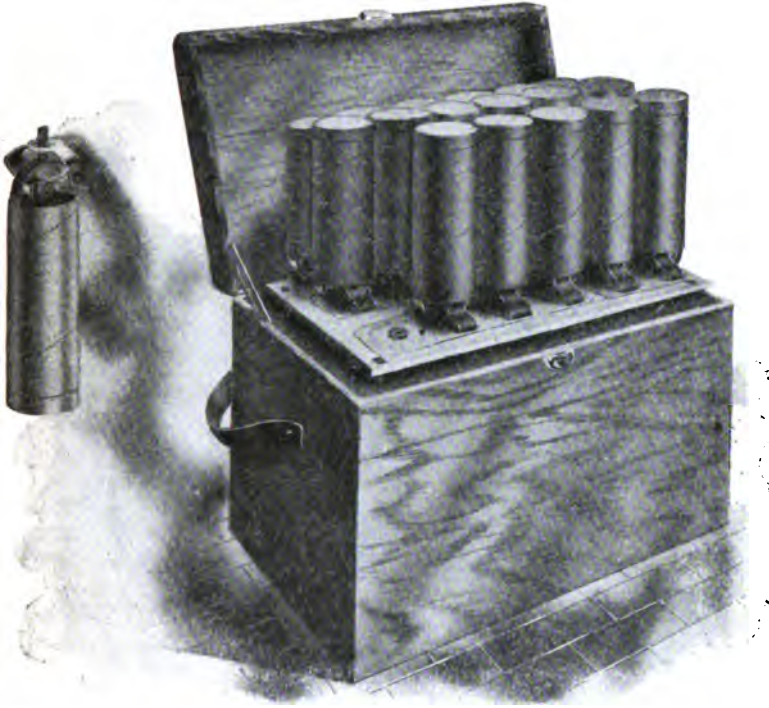
H. G.

NEW AND IMPROVED APPARATUS.

This department is devoted to publishing, with illustrations, drawings, and descriptions, new apparatus, electrodes, etc., for the benefit of those interested in the progressive improvements in armamentaria.

The Des Moines dry cell battery, shown in Fig. 1, is a convenient type of battery for general use, as the cells can be

readily replaced by lifting the switch-board out of the case, turning it up-side down, unscrewing the cells, and placing new ones in the sockets where the exhausted ones were. When it is necessary to move a battery from place to place, dry cells are particularly desirable. There is also no loss from evaporation of polarization, and an electrician is not necessary to repair



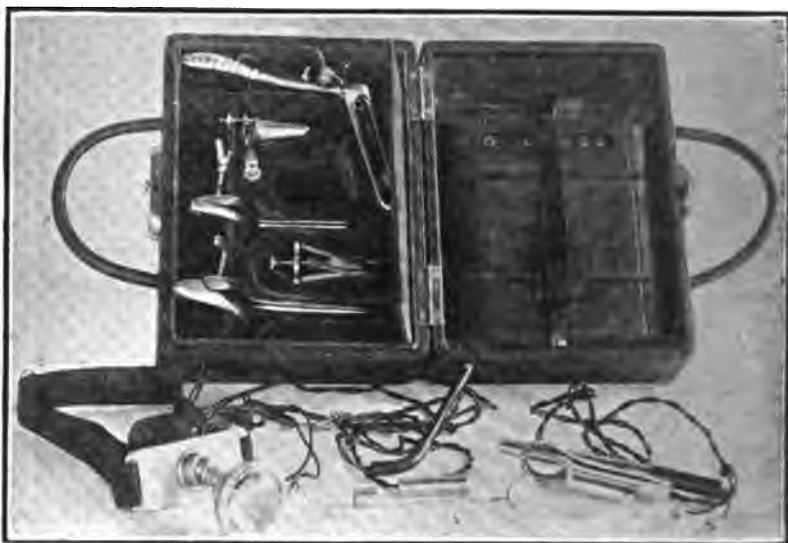
the battery. The company estimates the cost of maintaining the battery at from one to one and one-half cents for operation for one minute's duration. The price of the battery is \$65, and is manufactured by the Des Moines Battery and Electric Co., Des Moines, Iowa.

The Peerless "Special," shown below, an electrically lighted portable apparatus for diagnostic work, is a most complete instrument in every respect for the purpose. By its use the most careful examination of the accessible mucous cavities of the body can be made not only in the office but at the bedside of the patient with perfect ease. The batteries are composed of miniature dry cells, each showing when made, from 8 to 10

amperes on a dead short circuit or a combined average output of from 30 to 40 amperes. These batteries do not deteriorate materially when not in use. The incandescent lamps used show in test 3 1-2 volts and 1 + C. P. With the three-celled type the battery will run from four to six hours, and 10 to 12 continuous hours for the four-celled type. The intermittent service required by the operator insures from 30 days to two months use.

The apparatus is well and honestly made. The batteries are easily removed and at small expense.

The list of instruments comprise a searchlight; double tongue depressor; adjustable throat mirror; headlight; rectal, vaginal (medium and small), nasal and aural specula, and



also special specula light. The headlight, which leaves the operator hand free, is a low voltage glow lamp mounted in a metal reflector, fitted with a lens in front. The reflector and lens concentrate and project the light so that with a small battery, an illumination varying from 16 to 32 C. P. can be concentrated upon the part examined. The entire equipment is contained in a small black leather case, neat in appearance, 6 1-2 by 8 1-2 inches and with a depth of 5 inches. It is very light in weight and can be carried to the bedside of a patient as readily as a medicine.

We can cordially recommend it to the profession. The manufacturers are The Electrical Specialties Co., 188-190 Greenwich Street, New York City.

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THE EFFECTS OF THE SECONDARY STATIC CURRENTS IN REMOVING ALBUMIN AND CASTS FROM THE URINE, WITH REPORTS OF CASES.*

BY BOARDMAN REED, M. D., PHILADELPHIA.

Among the many cases of gastro-intestinal disease observed in my practice a considerable proportion—probably one-fourth of those which have involved the intestinal tract and been of long standing—have at times had albumin and at least hyaline casts in the urine. With a very few exceptions these cases have not shown any other renal symptoms, such as dropsy, etc., and have not usually tended to increase steadily in severity, as is so characteristic of true Bright's disease. On the contrary, many of them have proved amenable to treatment, especially when they could be induced to persevere with a proper diet and other appropriate therapeutic measures for the primary disease.

The pathology of these cases was at first puzzling to me, though I have long believed that they depended upon a real structural change in the renal epithelium, however slight. Such changes are apparently attributable to the irritation produced by the toxins resulting from indigestion and a faulty metabolism long continued. There seems to be no longer room for question that the cases described belong under the category of toxic nephritis. Dr. A. O. J. Kelly * has made a very satisfactory classification of the various forms of nephritis in which he places the familiar renal complications of the infective fevers, especially scarlet fever, diphtheria, etc., under the head of "acute toxic or degenerative nephritis." In describing the

* Read at the Thirteenth Annual Meeting of the American Electro-Therapeutic Association at Atlantic City, September 22, 1903.

† "Wood's Reference Handbook of the Medical Sciences," Revised ed., vol. v., article on "Diseases of Kidneys," p. 330.

symptoms of this form of renal disease he says it "may run its usually short and benign course entirely devoid of symptoms and without noteworthy alterations in the urine. The general manifestations of the intoxication or infection that gives rise to the kidney lesions may be not in the least aggravated." Further on Kelly speaks of such a nephritis occurring in the course of one of the infective fevers as a febrile albuminuria, adding: "The albuminuria, however, is probably due to the action of a toxin rather than to the fever." This is an important point. Autotoxic conditions, it is known, can cause a light and usually curable form of nephritis and toxins are constantly arising in the chronic indigestions, though less violent, as a rule, than those produced in the acute infectious fevers. I propose for these cases dependent upon chronic gastro-intestinal affections the name autotoxic nephritis without the prefix "acute," or any such prefix as "ephemeral," which would be more appropriate. They are in fact rarely or never acute when due to chronic indigestion, and while they are often ephemeral under efficient treatment, they may probably progress on into true chronic Bright's disease when the primary disease is neglected or wrongly treated.

While persistence with treatment appropriate to the primary digestive disorder has now and then been successful in getting rid of the albumin and casts, especially when aided by the use of some mild alkaline spring water or other diuretic, these cases frequently proved troublesome to me until I began about a year ago the use of static electricity in them. My attention was first called to the value of this agent in such cases by an article from the pen of Dr. A. D. Rockwell.* He reported five cases characterized by the persistent presence of albumin and casts in the urine, four of which were apparently cured by the frequent application of either the static wave or high-tension faradic current for months continuously and in one of them for eighteen months.

During the past year I have seen eighteen cases in which albumin and casts were more or less constantly found in the urine. Nearly all came complaining of symptoms referable to the digestive system or to disorders of nutrition. Only half of these could be induced to follow with any approach to regularity a course of treatment with the static induced or wave

* New York Medical Journal, January 18, 1902.

currents. It is important to note here that two of the cases were treated almost exclusively by means of the static induced current—every time except when my static machine chanced to be out of order and then with high-tension faradic electricity.

I will first report the more important cases, in all of which except one, the albumin and casts disappeared under the treatment, and then summarize briefly the results in the remainder.

Case I.—A widow and house servant, aged fifty-seven years. She has not been strong and has always had a delicate digestion. About ten years ago she had an apparently tubercular infiltration at the apex of one lung, but after a summer spent in Canada she returned without her cough and in much improved health. She has had no pulmonary symptoms since, but has been dyspeptic and obliged to live on a very restricted diet in order to be comfortable. In April, 1902, after ailing obscurely for several weeks she took to bed with a slight feverish attack complicated by some swelling of the ankles, but had no other noteworthy symptom. A sample of her urine sent me at the beginning of this attack showed a trace of albumin and a few fatty casts. Two subsequent examinations of her urine during the same illness revealed increasing quantities of albumin and both fatty and hyaline casts. She later went to Cooper Hospital, Camden, and did not come under treatment at my office until August 7 of the same year. Her weight then was eighty-eight pounds, and her urine contained one-tenth of one per cent. albumin, and hyaline, fatty and granular casts. September 5, I began to give her twenty-minute treatments with the static induced current three times a week. The electrodes used were one moist pad, 4 by 6 inches, over the solar plexus and one of block tin 2 1-2 inches wide and long enough to reach from the left side of the left kidney all the way around to the front of the liver on the right. A leather belt was buckled rather snugly around over this metal plate and a small cushion or pad placed between the two directly over each of the kidneys, so as to press the metal firmly against the body at those points. My idea was that in such an old dyspeptic case the liver was likely to be involved somewhat as well as the kidneys, and that therefore it would be well to include it also in the applications, but by extra pressure to cause the current to influence the kidneys especially. The analyses made every few days soon ceased to show any albumin except once or twice

a trace, but a few casts were occasionally found up to November 5, after which the urine contained neither albumin nor casts until January 21 of this year. Then a few hyaline casts appeared, but still no albumin. Meanwhile she had been improving greatly in strength and general tone and had been gradually resuming her work as servant. Some time before this the treatments were lessened to twice a week and by March the patient felt herself strong and well enough to take her old position as cook, but continued to come to my office once a week until the beginning of the past summer, when she discontinued treatment altogether, but kept on with her work. No albumin or casts were found in her urine from early in February till about the end of August, when it again showed a trace of albumin and a few hyaline casts, though she insisted then that she felt perfectly well and did not see the need of having the treatments again. Her diet has been practically the same as before she came under my care, and she took no medicine while receiving the electric treatments. Her weight has increased sixteen pounds, to 104 pounds. November 21, this patient after a few additional treatments by the static induced current, in the latter part of September and beginning of October, lost again all signs of renal trouble, and has since continued well and at her work.

Case II.—Dressmaker, aged forty-two; weight on beginning treatment 127 1-2 pounds, a loss of 15 pounds in eight months. She was first seen by my assistant, Dr. George O. Jarvis, June 9, 1902. She gave a history of syphilis contracted from her husband, and of chronic intestinal catarrh for fifteen years; was then anæmic, neurasthenic in a high degree, obstinately constipated, and unable to eat more than the smallest quantities of liquid diet. Analysis of stomach contents after an Ewald breakfast showed almost no free HCl and a total acidity of 62. Her urine contained one-sixth of one per cent. of albumin and also casts; urea one-tenth of one per cent. She came under my care July 28, 1902, and shortly thereafter went off on a vacation. Upon her return albumin and casts still appeared in her urine, though the remedies for her stomach and country air had improved her digestion and nerve tone. She was then placed upon treatment with the static-induced current, the same as in Case I., and except that the static-wave current was given two or three times instead, this was continued through-

out the autumn with occasional interruptions of a week or two. After the middle of October it was rare to find by Purdy's very delicate chloride of sodium test even traces of albumin, though at some of the examinations a very few casts were found. During November there was no albumin except at the first examination made in the month and no casts appeared. The same treatment was continued twice or three times a week during the winter except that after the middle of January, 1903, on account of its valuable tonic effect the static-wave current was given instead of the static induced, only the metal belt electrode described under Case I. being used. From this date on to the 16th of March the urine was examined eight times with a trace of albumin appearing in three of the analyses and in one of them two granular casts. On the 16th of March before the treatment the urine showed one-fourth of one per cent. albumin, 2.1 per cent. urea, and no casts. Then, within an hour after her treatment another sample of her urine was examined with a finding of the same amount of albumin, but an increased proportion of urea—2.3 per cent.—and an abundance of fatty and granular casts, thus showing strikingly the eliminating power of the electric treatment.

The patient meanwhile had many ups and downs in her general condition, often after marked improvement relapsing because of attempts to resume her work; but on the whole her condition averaged markedly better. After March 21 no more albumin appeared till June 3, when there was again a very small amount. Meanwhile treatment had been continued with the wave current at least twice a week and no casts had been found until near the last of May. Shortly before this the patient had been ordered a preparation containing a solution of nucleo-albumins, which I have often prescribed with advantage in anæmic and nervous cases. By accident she procured instead a modification of the same preparation containing in addition full doses of arsenic and strychnine, the former of which could be only hurtful in such a case. I knew nothing of this till she had taken the wrong preparation some two months, during the latter part of which period she had been gradually growing worse. From June 1 until the arsenic preparation was stopped on July 10, the urine showed almost constantly considerable amounts of albumin and numerous casts, hyaline, fatty, granular, and even cellular.

After a withdrawal of the obnoxious medicine treatment with the wave current was resumed and kept up regularly during the remainder of July and during August up to the 28th, when she went into the country. On August 26 the urinalysis showed not even a trace of albumin, though still a few fatty casts. She was then eating plentifully of a variety of food, her nerve tone was comparatively good, and her chronic enteritis with obstinate constipation was so much improved that her bowel movements were normal with the help only of a two-ounce enema of cotton-seed oil at bedtime, and only at long intervals was there a little mucus mixed with the stools.

Case III.—Clergyman, aged thirty-nine, weight 182 pounds, had received advice from me a few times previously on account of indigestion, but came regularly under treatment for a severe breakdown in health August 20, 1902. He had been under a very heavy strain and complained much of impaired digestion, sleep and nerve tone. His urine contained one-fourth of one per cent. albumin as well as fatty, hyaline, and granular casts. The static induced current was applied as in Case I. for twenty minutes three times a week, with more than usual regularity until the end of October, when, no albumin or casts having been found in his urine for about a month, he began coming for treatment once a week only and soon dropped off to once or twice a month. Toward the end of the year he felt himself to be restored to health, having no longer any complaints and there had been no albumin or casts discovered in his urine for three months, except once early in October a trace of the former, and he therefore discontinued treatment, but still brought in a sample of his urine for examination once every month or so. These tests continued to show the urine free of casts and albumin as well as other evidences of renal disease till the end of last May, shortly before the patient was to sail for Europe, when a trace of albumin and a few hyaline casts were again discovered. These were an evident result of a return of his indigestion in consequence of another prolonged period of mental and nervous strain with neglect of the hygienic precautions which had been enjoined upon him.

Case IV.—Clergyman, aged thirty-four, and weighing 154 pounds, consulted me February 26, 1903, on account of having been refused a life insurance policy because of albumin in his urine. He had heard of my success in Case III. and de-

sired to be rid of his albumin so that he might be insured. But a careful examination showed him to be otherwise in wretched health. The history revealed an attack of cystitis six years before, and there had been recent symptoms of irritation at the neck of the bladder. The analysis of his stomach contents after a test meal gave the following results: Free HCl .123 per cent.; total acidity 58. A rather heavy smoker and eats many sweets. There was found a movable right kidney and some gastropnoxis. Urinalysis, February 26, 1903, showed albumin one-fourth of one per cent. and fragments of casts; urea 1.7 per cent. He received the static wave current three times a week for some four weeks without any noteworthy diminution in the amount of albumin, while the casts also persisted, though the excessive HCl in his stomach was controlled by medicines. The static wave as usual had produced a marked improvement in his nerve tone and general health, but becoming discouraged on account of the persistence of the renal condition, he gave up treatment.

The reports of these four cases do not call for much comment, since they tell so plain a story. The treatment failed in Case IV., but Cases I., II., and III. demonstrate beyond question the favorable influence of the secondary static currents, the static induced especially, in removing albumin and casts in what must be admitted to have been at least threatening cases. We know too little of the exact pathology of these autotoxæmic conditions to say surely that a serious form of Bright's disease can develop out of them, but I believe that it can. Case IV. was probably one of parenchymatous nephritis due to an extension of catarrhal inflammation upward from the bladder and might or might not have yielded to a longer treatment. Case II. is interesting in showing how deadly our drugs may prove when wrongly chosen or persisted with too long.

Five other dyspeptic patients in whose urine albumin and casts were demonstrable at most of the earlier analyses, received applications of the static wave current for a month or more during the past year with results analogous to those reported in Case III. The albumin and casts rapidly disappeared while they were under treatment, with a coincident improvement in their general health; but it should be added that their cases were milder than the four reported above. Two persisted with the treatment for several months in order to clinch the cure

and these now no longer show signs of renal disease, though it is likely that exposure to severe chilling or a recurrence of marked autotoxæmia from prolonged digestive trouble would produce again a disturbance in the kidneys with a reappearance of albumin and casts in the urine.

Nine other albuminuric cases have been seen by me during the year and all of them, with one exception, have had occasional applications of one of the secondary static currents through the region of the kidneys; several of them received many such applications at long intervals; but nearly all of these live out of the city, so that it was inconvenient for them to come in for regular treatment, and since they have been doing fairly well with the help of diet and medicines, they have been content. In all of them who have continued to report themselves and have examinations of the urine made, the renal trouble has been kept under control and in some instances either caused to disappear altogether or much improved by attending to the digestive fault, but there is no doubt in my mind that applications of static electricity continued for several months would render their condition very much safer and greatly increase their prospects of longevity. In the milder cases, at least and possibly in all of them, I believe that such a course continued long enough, provided their digestive disorders were at the same time properly treated, would result in definite cures.

The restudy of the eighteen cases here reported has taught me much that, I feel almost ashamed to say, I had at least partly overlooked before. One point especially it has impressed upon me very forcibly, and that is, the fact evident from the above detailed reports, that the static induced current has a decidedly greater curative power in the kidney affection described than either the static wave or the high-tension faradic currents. The last-named seemed to be much less marked in its effects upon the kidneys, though I have given it by no means so thorough a trial. The static wave current has proved in many cases a valuable nerve tonic, and as most of these patients with albumin in their urine were also very nervous, I chose it as the preferable form of application in the majority of the cases, especially since Dr. Rockwell, whose lead I was following in trying the method, had chosen this form. It is noteworthy that Cases I. and III. in which I had employed this form of treatment almost exclusively, pursued a more uniformly favorable

course than the others; and that Case II. made better progress while under this than later under the static wave form of treatment. So far as known to me, I am the first who has used the static induced current in kidney disease, and the results achieved by it seem so much better than those from the other currents that I shall hereafter give it the preference in such cases. Much might be said as to the way in which electric stimulation acts in renal affections, but this paper is already long enough.

Let me say a few words further apropos of the extraordinary impression, still retained apparently by some physicians who have not found it convenient to make use of static electricity, viz., that the only effects exerted by it are psychic and due to suggestion. Having been promptly cured myself four years ago by static sparks of a neuritis which had resisted for three months such energetic measures as hot air, blister, and nearly all the other forms of electricity, I should seem entitled to a positive opinion upon the subject; but to clinch the matter I had analyses of the urine made before and an hour after a number of the treatments in the cases above reported, and in every instance except one, the percentage of urea was considerably increased at the second analysis; in the one exception it remained the same. The experiments certainly proved that the treatments produced a positive physical effect upon the metabolism.

Since the foregoing paper was prepared and read, I have made an experiment upon a new patient with the most extraordinary result as to the influence of the static wave current in stimulating the excretion urea.

The patient was a professional man of sedentary habits who has been accustomed to eat rather generously and to drink very little fluid of any kind. He came to me recently, complaining of indigestion, and during an interval in my examinations of him, I had him take an electric treatment. In this instance an electrode 1 inch in diameter by some 20 inches long was passed down in contact with the spine, there being no other connection with the machine. He was then given a treatment with the static wave current for fifteen minutes, the spark gap being about 1 1-4 inches. Shortly before this as a part of my routine examination of the abdomen, he received at different times two goblets of water, in one of which was dissolved about 60 grains of bicarbonate of soda. A little while previous to the treatment he was asked to pass some urine, but was unable

to pass more than an ounce or two, which was insufficient for all the purposes of my usual urinalysis. Therefore, shortly after the electric séance, and within about three-quarters of an hour from the time he passed the former specimen, he was asked to pass as much more as he could. The two samples were kept and afterward examined separately. The results were as follows:

Before Static Wave Treatment.	After Static Wave Treatment and drinking two glasses of water.
Specific gravity..... 1038	Specific gravity..... 1025
Total acidity. 96	Total acidity... .. 52
Indican..... small amount	Indican small amount
Uric acid..... about normal	Uric acid about normal
Urates about normal	Urates about normal
Urea 0.8 per cent.	Urea..... 2.0 per cent.
Xanthin bases moderate amount	Xanthin bases..... moderate amount
Phosphates, alkaline excessive	Phosphates, alkaline... lessened amt.
Phosphates, earthy excessive	Phosphates, earthy..... lessened amt.
Creatinin excessive amount	Creatinin..... excessive amt.

Allowing for the dilution of the second sample which resulted from the two glasses of water taken meanwhile, the percentage of urea eliminated was more than five times as great as before the treatment. Notwithstanding the contributory part played by the bicarbonate of soda in stimulating excretion to some extent, the above-mentioned result is certainly very striking. The effect of the soda could hardly have been very marked by the end of not more than three-quarters of an hour, and there can be no question that by far the larger part of the result was attributable to the direct stimulation of the nerve centers governing the renal secretion by the electricity. Incidentally, too, this experiment emphasizes the great importance of regularly determining the total acidity of the urine, since the total acidity of the first example was 96 as against the normal of 25; and in all such cases there is an urgent need of administering alkalies in addition to whatever other mode of treatment may be indicated.

Discussion.

Dr. A. D. Rockwell said he could safely say that he belonged to the conservative school, and certainly so far as Bright's disease of the kidney was concerned he would not be sufficiently optimistic to say that electricity or any other method of cure

would greatly alleviate, not to say cure, chronic Bright's disease. However, he did believe that by exciting circulatory drainage much could be done in the way of relieving inflammatory reaction in the tubules and stroma of the kidney, a condition which was asserted to be Bright's disease. There seemed to be no sharp line to distinguish between acute inflammatory disease of the kidney and structural disease. Both were characterized by the appearance of albumin and casts in the urine. He thought it could be claimed that much could be done by electricity in the relief of kidney disease—he would not say Bright's disease. Electricity was certainly an agent for reducing congestion and increasing the blood pressure in the glomeruli in the kidney, and in this way it improved the nutrition of the kidney and freed the glomeruli, theoretically at least, from the products of inflammation. So far as the treatment was concerned, he would not have the profession too optimistic with regard to what electricity could do and as to how these results could be obtained. It was five years before he secured five cases that seemed to him indicative of the power of the electric current to relieve certain of these cases. All of his cases had been treated for periods of from three to eighteen months. He did not doubt the accuracy of Dr. Reed's cases, and he did not think anyone present would doubt the accuracy of his own clinical records; nevertheless, in endeavoring to impress the general profession with the potency of electricity it was well to have them authentic in every respect. For this reason he had had all of his cases under the observation of fellow members of the profession. His own results had all been attained with the static wave-current, and by the use of the high-tension current, but it was, of course, unnecessary for him to say that in the treatment of all these cases the patients were also treated dietetically, though probably they had previously been subjected to a similar dietetic regimen. The method under discussion seemed to him to be of value in the treatment of the milder forms of kidney disease.

Dr. W. B. Snow said he desired to ask Dr. Reed a question as to the election of currents. The reader of the paper stated that he had had good results from the wave-current, and had generally selected it in all cases, and would have preferred it if he had secured the same results as from the static induced. He would like to know what length of spark gap had been used with the wave current and with the static induced current. Dr. Rockwell had very ably explained what he believed to be the true action of these currents in relieving this engorgement of the kidney. It would be found that if the patient were obese, and either the static induced or the wave-current was used, a much larger spark gap would be required; hence it was not improbable that in the cases in which Dr. Reed had used the wave-current the spark gap had not been sufficiently great. The speaker

said he believed that in any case of this kind the same result could be obtained with the wave-current as with the static induced current. He thought the wave-current would give more uniformly good results than the static induced because the latter was more local in its action, and gave less nutritional effect. In treating the back he made use of a spark of from four to six inches, and in obese persons, a gap as high as eight inches.

Dr. G. Betton Massey said he desired to mention some work he had done in one case some years ago at the suggestion of a physician of Germantown, Philadelphia. His attention was called to the fact that a Dr. Massey of Bordeaux had reported several cases of glycosuria improved by static electricity. The speaker said he had, therefore, undertaken the treatment of a patient whose urine showed a considerable quantity of sugar in it, and had used static electricity for the treatment. Examinations had been made from time to time to determine the quantity of sugar in the urine. The treatment was kept up for several months, and although finally abandoned because ultimate success did not seem probable, it was found that the effect of the treatment upon the quantity of sugar in the urine was very marked and satisfactory.

Dr. Reed, in closing the discussion, said he was very glad indeed to hear so full a discussion of this important subject, a matter which had impressed him very deeply at the time of the first appearance of Dr. Rockwell's paper. Although the machine that he had used was not a large one, only a six-plate machine, and the current was not always sufficiently powerful, he had accomplished a good deal. Perhaps a more powerful machine would have given better results with the wave-current. It was not always possible to obtain long sittings and a prolonged course of treatment, and, hence, he favored the use of a stronger current. This was his reason for preferring the static induced current, especially in the more advanced cases. None of his patients were obese or very muscular; on the contrary, they were for the most part thin and nervous. He did not claim that any of his cases had been cured; he simply claimed that after from one to three months' treatment they were free from albumin and casts in the urine so long as they were careful in observing a proper mode of life.



THE THERAPEUTICS OF THE CONTINUOUS CURRENT.

BY MARGARET A. CLEAVES, M. D.

CHAPTER II. (*Continued.*)

The Current: Its Effects and Physiological Action.

In studying the effects of the current, its effects on other substances than the inorganic constituents should be clearly understood.

It has been proven by Stewart,* that the proteid constituents are only to a small extent, if at all, affected by the direct electrolytic action of the current. Coagulable proteids, egg-albumin, serum-albumin, and myosin when subjected to the action of the current, showed that the conductivity of the salts was very great as compared with that of the proteids of the tissues.

Boiling or any method which tends to diminish the normal proportion of the saline constituents of muscular tissue, increases its resistance, that is, lessens its conductivity. For example, a muscle containing but one-tenth its normal supply of salts has ten times the resistance of one containing a normal supply.

If rabbit's muscle is boiled in distilled water for 45 minutes, its resistance will increase in the proportion of 13 to 22; and if re-boiled with fresh water, the resistance will increase to three times that of the normal muscle, although the residue contains as much as thirty per cent. of the original ash.

Carbohydrates are also very poor conductors. A 2.6 per cent. solution of grape sugar, for example, has 142 times the resistance of a 2.6 per cent. solution of sodium chloride, while a solution of cane sugar of the same percentage has a resistance 905 times that of a similar solution of common salt. The resistance of starch is even greater than that of cane sugar. The nitrogenous crystalloids, urea and uric acid, are better conductors than the carbohydrates, but much inferior to the organic salts. A 1 per cent. of urea has a resistance twenty times that of a 1 per cent. solution of common salt. The con-

* On Electrolysis of Animal Tissues, G. H. Stewart. Studies from the Physiological Laboratory, Owens College, Manchester, England.

ductivity of urine, rich in urea, is dependent upon the salts contained therein, that is, the greatest part of the current is carried by them. In a previous page it was pointed out that fats are poor conductors.

All of these facts emphasize the statement which has been made, *i. e.*, in living tissue the greatest part of the current passes by the decomposition of the inorganic substances. This fundamental physical fact is the very corner-stone in the therapeutics of the continuous current; to it the physical effects of the current are due, and upon physical effects, physiological action is very largely, if not entirely, based. In addition it teaches the practical lesson of the necessity for the use of solutions of sodium chloride or sodium bicarbonate, for making electrode contacts, especially where intense polar action is desired.

Stewart's experiments also show that hæmoglobin, unless diluted with a chloride of sodium solution, has a very high resistance, so high that if dissolved in distilled water, save the greatest care is taken to prevent impurities in the latter, the water will conduct a sensible proportion of the current. This, although distilled water by the absence of its salts is practically a non-conductor. His experiments show conclusively that hæmoglobin is not directly affected by the current, but is only affected by the products of electrolysis at the anode. There is no direct electrolytic transfer of undecomposed hæmoglobin, and the changes in the pigment are due to secondary actions. Upon hæmoglobin the secondary action at the anode is always much greater than at the cathode, and with weak currents there may be no change at the latter except the increase of the alkalinity. With blood the effect at the cathode is much more marked than with hæmoglobin simply because the former contains all its salts, instead of only a trace as with the latter, and a given electromotive force will therefore, by reason of the lessened resistance, send a much stronger current through it. By adding sodium chloride to the hæmoglobin solution until its conductivity was equal to that of blood, it was found that there was no observable difference in the nature and amount of the spectral changes but the anode was always much more powerful than the cathode. An electrolysis of blood resulted in an increasing alkalinity at the cathode, with solution of the

corpuscles and formation of alkali-hæmatin; at the anode a growing acidity and formation of acid hæmatin.

The changes were the same as those which took place in artificial proteids, and in both pointed to a relation between the changes in reaction and their effects. There is every reason to suppose from the action which takes place that the alkalies formed in the electrolysis of blood by the decomposition of the salts, dissolve the red blood corpuscles. In an electrolysis of egg-albumin, the decomposition of the salts, small in amount as compared with blood, converts the albumin into alkali-albumin. It was clearly evident therefore that the action upon the red blood corpuscles is entirely a secondary one and due to the presence of the alkalies. At the anode, as has been stated, an active oxidation goes on. The small relative amount of gas given off corroborates the belief that the nascent oxygen corresponding to sulphion and other anions, is intercepted by the hæmoglobin, which it oxidizes. By keeping the reaction alkaline, the liberated acids do not attack the hæmoglobin. The presence of free alkali protects the hæmoglobin from the action of the products given off at the anode, by uniting with the anions. "The absence of the loosely combined oxygen of the oxyhæmoglobin appear to condition the ultimate destruction of the blood pigment at the cathode. The oxyhæmoglobin it is supposed, therefore, is saved from the attack of the reducing agents given off at the cathode, by parting with some of its loosely combined oxygen, thereby preserving its molecular oxygen intact."

The changes in the proteids of the serum and the stroma of the corpuscles in entire blood were followed with difficulty. At the anode, however, a part of the proteids of the serum were coagulated and in connection with masses of altered corpuscles, formed a layer on the electrode which could be seen, while still another part became acid-albumin. At the cathode, the stroma of the corpuscles went into solution forming alkali-albumin. A part of the globulin element of the hæmoglobin appeared about the anode in a coagulable form. It is probable, concludes Stewart, that a part is changed into an acid albumin.

Electrolysis of bile, showed very markedly the oxidizing action of the anode. The bilirubin was oxidized first to biliverdin and with a strong current to colorless or almost

colorless products. The biliverdin was again reduced to bilirubin by reversing the currents and exposing it to the action of the cathode; still further cathodic action changed the bilirubin into a yellow pigment. The mucin was precipitated on the anode by the liberated acids, while around the cathode it was partly changed into alkali-albumin. The bile salts are fairly good conductors, and the action obtained is again a secondary one. Electrolysis of urine (which conducts by reason of its salts) points again to the conclusion that the action obtained is a secondary one, and in addition, certain changes noted, suggest that at "the very surface of the electrodes, the secondary actions may have an intensity quite out of proportion to the total amount of chemical change, considered as uniformly distributed through the whole conductor. In practically a mixture of inorganic salts, the direct decomposition may be trifling compared with the indirect effects." Electrolysis of animal tissues is an electrolysis of the salts contained in them and direct decomposition of other constituents is insignificant as compared with the secondary and indirect effects of the products of the electrolysis of the salts.

The electrolysis of muscular structure is necessarily more complex than that of a physically homogeneous liquid. Its cells are bathed in blood and lymph and these liquids inside a muscle conduct, so far as they have continuity, as they would outside the body. As a fact this liquid electrolyte only becomes discontinuous by reason of the cell wall which acts as a porous partition or diaphragm, to be considered more especially under the phoretic action of the current.

Inorganic salts are everywhere in the mass of a tissue, in solution or perhaps in combination, chemical or molecular, with the proteid substances. In addition to the primary polar action in muscular tissue there is a secondary one as with animal fluids. The phenomenon of internal polarization appears. To quote Stewart's own words, "The ions are shed out upon a multitude of secondary electrodes within the substances of the tissues. This polarization, combined as it undoubtedly is with secondary transition resistances, may cause a distribution of the current, which does not correspond to the resistances of the constituents when taken separately. It indicates abrupt changes of potential within the muscle, and therefore indirectly to abrupt changes of conductivity. This

is a justification of the conclusion that the greatest part of the conductivity of the tissues is electrolytic."

An electrolysis of myosin with a high current resulted in an increased fluidity of the contents of the cathodic compartment, brownish in coloring and having an intense alkaline reaction. There was no coagulum present and qualitative and quantitative analysis showed copious precipitate on neutralization, consisting of alkali-albumin and containing but a trace of proteids. In the anodic compartment there was complete coagulation of the myosin, forming a white mass on the electrode, lying in a thin watery liquid and of an intense acid reaction. A mild current in longer time left the process still incomplete in the cathodic compartment and there remained present quite a quantity of unaltered globulin, although a considerable amount of alkali-albumin had been formed. The reaction was strongly alkaline. At the anode, however, the process was almost complete. Nearly the whole of the myosin was collected thereon as a coagulum. Its reaction was intensely acid and analysis showed a small amount of acid-albumin in solution, with a small amount of unaltered globulin. Reversal of the current while to a limited extent restoring the original condition at the poles, showed that a chemical change had been wrought in the proteid substance by the former electrolysis; "that myosin molecules had not simply been rent from their basic mates and transferred unaltered to the anode."

If the electrolysis was carried far enough, *i. e.*, sufficiently high current, to leave no coagulable material in the cathodic compartment, no deposit was left upon the anode when the current was reversed. The deposit on the anode, which obtained upon reversal, was due to an electrolysis of the myosin previously unacted upon. All of these experiments showed unmistakably that the proteid constituents are affected by the secondary actions. Apart from actual chemical composition, the change in the reaction may itself produce important effects on a living tissue, and not only in the immediate neighborhood of the electrodes, but it may penetrate deeply between them as well. Under the secondary action of the current must be included the antiseptic action. As has been indicated, there is a removal of the salts which tends to starve the septic organism, but unquestionably the antiseptic action

of the current is due mainly to the reaction established at the poles. Thirty c. c. of rabbit's blood, electrolyzed for four hours by a current of 45 milliamperes, showed no putridity in the anodic compartment for ten days; but in the cathodic compartment, it became putrid in two and one-half days. In the one the reaction was acid, in the other alkaline, and acids are known to be better antiseptics than alkalies. The antiseptic action on bile is however cathodic instead of anodic. As it is the mucin which tends to the putrefaction of bile, shown by the fact that its precipitation by alcohol prevents decomposition even when the alcohol is removed, and as an electrolysis of bile precipitates the mucin on the anode, it follows that the cathode should have an antiseptic action. A well-developed putridity of bile can be overcome by the action of the current.

There must not be found in the antiseptic action of the current any reason for a lack of the most perfect antiseptic precautions in its use. In the care of electrodes used in therapeutic applications, if one's conscience permitted a differentiation it should be in favor of the anode rather than the cathode, as the former is the antiseptic pole but no such difference should obtain. The antiseptic precautions in both instances must be as thorough as for the most profound surgical operation.

Upon these and other physical effects of the current (to be considered under the head of electrical osmose or phoresis), so much depends in establishing a rational therapeutics, that the result of the classic experiments of Stewart have been given in considerable detail. The ground was carefully covered, step by step, to prove: first, that conduction in the living tissue is electrolytic; second, that it is by way of the salts that the greatest part of the current is carried; third, that the hæmoglobin is not affected by the current but only by the products of electrolysis which appear at the anode; fourth, in the electrolysis of blood the red blood corpuscles are dissolved by the alkalies at the negative pole; at the positive pole an active oxidation goes on by the action of the nascent oxygen, sulphur and other anions on the hæmoglobin; fifth, the phenomena of internal polarization; sixth, the secondary action of the current pointing to the removal of the electrolytes; and seventh, the antiseptic action.

But the physical effects of the current are not only polar, but intra-polar as well. In an electrolysis of a frog's leg it was very quickly shown that a current of even moderate strength interfered with the circulation. The leg of a pithed frog, with a current of 20 milliamperes continued for four minutes, became paralyzed, and stimulation only caused twitching of the toes. In twelve minutes the muscles began to feel hard, the circulation in the web was almost completely stopped, and none of the current could pass through it. Slow oscillatory movements of the blood could be seen in some parts. No reflex movement followed the closing of the current. At the end of thirty minutes the toes still vigorously responded to direct stimulation, but the rest of the leg was inexcitable. That so prompt and profound an influence upon the circulation would tend to the production, in a very short electrolysis, of a sensible diminution of the salts is very plainly evident. The amount of inorganic matter in the tissues is trifling in amount, not more than one per cent. of the whole, but the vitality of every tissue depends upon it. As no current passes save by the decomposition of a corresponding part of the inorganic matter, it follows that even mild currents produce profound effects. This is a matter of common observation in therapeutic work.

The current, as has been demonstrated, is mainly carried by the constituents of the tissues which are absolutely necessary to life, and in the decomposition which results, there is a removal of the products of decomposition to the electrodes. "By diffusion there is a tendency to distribute this loss throughout the inter-polar region, and partially to restore it by bringing together again the separated ions, yet its effects cannot be very great within an ordinary electrolysis." Whatever tends to the removal of the salts from a part, interferes with its nutrition, even its life. If a muscle contained an increased amount of salts, say ten times the normal supply, the same electromotive force which produces 100 milliamperes of current through a normal muscle, would produce by reason of increased conductivity, *i. e.*, diminished resistance, eight to ten times as much current, but there would be no greater percentage of change, nor would there be any greater disturbance of physiological stability.

The salts are removed from the neighborhood of the elec-

trodes, in the first instance, but this loss soon tells upon the intra-polar region, and at the same time intensifies the secondary action at the poles. The phenomenon of internal polarization indicates that in addition to the removal of salts from the intra-polar region, electrolysis may exert upon that region an influence more allied to its polar action. The amount of water removed by secondary decomposition can scarcely ever be large enough to have an appreciable effect. The following experiment by Stewart shows the great reduction of salts and also of watery extract at the anode by the electrolytic action of the current. Ninety-five grams of minced rabbits muscle was subjected to the action of 350 milliamperes of current, 35 milliamperes per square centimeter of surface, for thirty minutes. After excluding the layer immediately in contact with the platinum disk serving as the anode, in order to exclude the electrolytic products in the ash, a careful qualitative and quantitative analysis was made, which showed that the electrolyzed, in comparison with the unelectrolyzed muscle, contained 1.0 per cent. watery extract, as against 5.2 per cent. and .24 per cent of ash as against 1.3 per cent. in the unelectrolyzed muscle. This is a reduction of the watery extract to one-fifth of the normal amount, and of the ash to one-sixth. The anodic portion alone which originally contained .52 gram of salts had suffered a loss of .44 of a gram. This amount had totally disappeared. It was proven by further experiments that this loss was not wholly due to the decomposition by electrolysis, but that a certain amount was carried toward the cathode by electrical endosmose. Just so long as the circulation is maintained in a part, the action is not one of electrolysis alone, but of electrolysis and cataphoresis.

If a current of considerable density passes through a part, the circulation is sensibly affected, especially in the neighborhood of the electrode. This would follow an intra-uterine application, for example. Within the uterus the current even though the dose was not large, would have considerable density. Because of this fact there would be less of cataphoric transfer of the fluids and salts with a current of high amperage and great density, than with a current characterized by low amperage and current distribution.

In any condition where it is desired by the use of the cur-

rent either to deprive a part of its fluids and salts, (anodic) or to increase its nutritive activity (cathodic) large well wetted or water contacts with low amperage is indicated. It follows therefore that the dose and the manner of use is indicated by the physical effect, and also, as will be seen, by the physiological action of the current.

Physiologically, a tissue may be excited first and then destroyed by the diffusion of its salts into distilled water.

The removal therefore of a considerable proportion of the salts, even if the removal be but temporary, will destroy a tissue, and a removal of only a small proportion will interfere with its nutritive activity.

This action may penetrate much further into the intra-polar region than the secondary action at the electrodes. The physical effects due to electrolysis, govern not only such uses of the current as are frankly intended to be destructive and denutritive, for example, in the destruction of a mole or the absorption of an exudate, but equally the physiological action of the current. It follows therefore that anodic sedation and cathodic stimulation are the result of the phenomena described, still further influenced by the third mode of action or cataphoresis. Thus cataphoresis, as will be shown, is not purely polar, but is an action that is felt along the path of the current. It must always be borne in mind that the path of the current in therapeutic applications is not necessarily the most direct way between the electrodes. This depends upon the distribution of the blood-vessels, for as the blood is richest in salts (the electrolyte), it is the way of best conduction, *i. e.*, least resistance, and the current may find its way from one electrode to another in a tortuous, roundabout fashion. Therefore the anatomical distribution of the blood-vessels should always be borne in mind in adjusting electrode contacts for a pathological condition.

(To be continued.)

REPORT OF A CASE OF CARCINOMA OF THE BREAST TREATED BY MASSIVE MERCURIC CATAPHORESIS.*

BY G. BETTON MASSEY, M. D., PHILADELPHIA.

My purpose in selecting a single case as the subject of a further report on the electro-chemical destruction and sterilization of cancerous growths is explained by the unusually typical na-

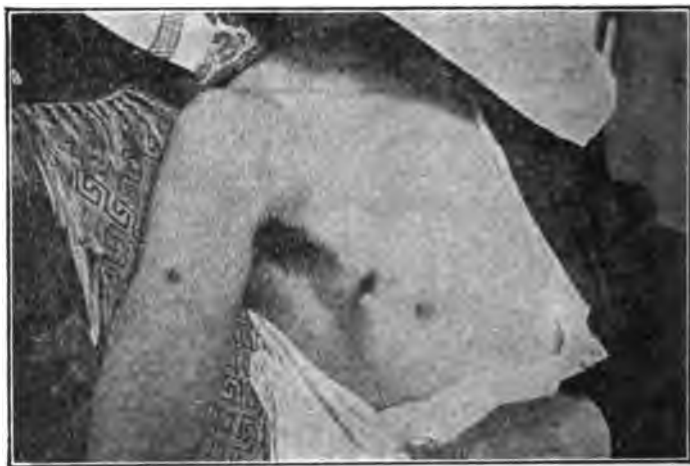


Fig. 1.—Photograph of growth, October 9, 1902, before application of cataphoresis.

ture of this case, as one on the border line of the inoperable; and by the further facts that I happened to secure a series of photographs of its progress, which are herewith reproduced, and that a careful microscopic examination was made of a specimen taken from the growth just before turning the current on. This latter corroboration of the diagnosis has been omitted by accident in some cases, and if a specimen is not secured before the application it is of course impossible to do so after the tissues have been so completely changed by the chemical infiltration.

The case is reported, also, only after a year has elapsed since

* Read before the Clinical Society of the New York School of Physical Therapeutics, October 23, 1903.

the single application of massive cataphoresis was made. This proper delay has enabled me to make a better estimate of the success of the treatment than would be possible in what might be called a "wet-specimen" report.

Mrs. S., a widow, aged fifty-seven, was brought to me by Dr. Theodore Saulsbury, of Burrsville, Md., October 7, 1902. She had been in poor health for several years, owing to an inactive liver and defective kidney secretion, but the growth in the



Fig. 2.—Appearance on October 10, the day after application.

breast dated back only seven months (March, 1902). The growth was situated in the upper and outer half of the right breast, measured about two and a half inches in diameter, and was movable on the chest wall. The skin overlying the growth had been invaded by the cancerous process and presented an area of ulceration about the size of a dollar. In the axilla there was a movable enlarged gland the size of a peach stone, showing that the disease had advanced to the stage of regional infection. The general appearance of the breast is shown in Fig. 1.

On October 9, 1902, the patient was placed on a spring cot with a large negative pad in moist contact with the entire back, and, under general anæsthesia, the active electrodes of zinc coated with mercury were inserted one at a time into the growth

near its periphery, connected with the positive pole of an apparatus with a pressure of 160 volts, and a direct current of about 200 milliamperes per electrode was gradually turned on. These active electrodes, being connected with the branched conducting wire from the positive pole of the apparatus, could be placed in position as the current was increased without turning the latter off. The area to be destroyed made it advisable to employ from three to four points simultaneously, the total current in circuit being raised to 720 milliamperes at the expiration of



Fig. 3.—Appearance of healing wound on December 3, eight weeks after application.

about twenty minutes. One of the points was placed in the middle of the axillary gland and kept in this situation during the greater portion of the operation. From time to time one of the points was removed when a sufficient necrosis had appeared at its situation, fresh mercury added to its coating, and replaced in a fresh spot in the growth.

Within a few moments of the attainment of a sufficient current in the circuit the characteristic whitish-gray necrosis appeared about each point, and at the expiration of one and a half hours the whole growth, the diseased gland, and the intervening tissue had been necrosed bloodlessly, and a considerable zone surrounding the necrosed area rendered sterile, so far as outlying cancer cells were concerned.

The patient was now put to bed under the care of a nurse, and suffered but little pain after recovering from the ether, though some soreness persisted for several days. The photograph, Fig. 2, shows the condition of the area under treatment the following morning, the dark line at the edge of the necrosed area indicating the point at which the line of demarcation subsequently developed. At the end of six weeks the slough (which by the way, was entirely inodorous from the ionized



Fig. 4.—Five months after application (photograph of March 30, 1903), showing healed wound except small spot due to imprisoned quicksilver.

mercury and zinc salts dispersed through it) came away, leaving a clear, granulating wound. The third photograph, Fig. 3, shows the condition at the end of eight weeks, when the patient went home. The fourth photograph (Fig. 4) was taken March 30, 1903, showing, about six months after the treatment, a healthy scar except at one spot, which was subsequently found to be due to a drop of metallic mercury accidentally imprisoned in the tissues. This was let out, and the tiny sinus sterilized by one application of 10 milliamperes from a zinc-mercury needle inserted into it. No further treatment has been given this case and the final photograph (Fig. 5) shows the present condition, one year after the application. This photograph, which was taken with a better lens than the preceding

ones, not only shows a most excellent and healthy scar, but a much plumper and healthier woman. In a recent letter the



Fig. 5.—One year after application, showing healthy scar and restored general health.

patient states that she is well in every way, and that her general health is better than for a number of years.

BIBLIOGRAPHY.

"Local Electrolysis and Zinc-Amalgam Cataphoresis in Malignant and Non-Malignant Tumors," *Medical News*, March 9, 1895.

"The Treatment of Hemorrhagic Conditions of the Uterus by Zinc-Amalgam Cataphoresis," *Journal of the American Medical Association*, August 24, 1895.

"Zinc-Amalgam Cataphoresis in Muco-purulent Inflammations and Malignant Growths," *Philadelphia Polyclinic*, October 19, 1895.

"On a New Treatment of Sarcoma," *American Medico-Surgical Bulletin*, June 27, 1896.

"The Treatment of Cancer by a New Method, viz.: the Electrical Diffusion of Nascent Oxchlorides of Mercury and Zinc," *Medical Record*, July 31, 1897.

"On the Radical Cure of Malignant Disease by the Cathodic Diffusion of Mercury from Gold Electrodes, with

details of Late Improvements in the Author's Method," Philadelphia Medical Journal, March 19, 1898.

Chapter on the Treatment of Malignant Disease in "Conservative Gynecology and Electro-Therapeutics," The F. Davis Co., Philadelphia, 1898.

"The Cataphoric Treatment of Cancer." Trans. American Electro-Therapeutic Association for the year 1900.

"Cases of Carcinoma and Sarcoma Recently Treated by Electric Sterilization." Transactions of the Philadelphia Co. Medical Society, 1902.

"The Destruction of Cancerous Growths and Sterilization of the Surrounding Tissues by Mercuric Cataphoresis." International Medical Magazine, November, 1902.

"The Treatment of Carcinoma of the Rectum by Mercuric Cataphoresis." Journal of Advanced Therapeutics, May, 1903.



HIGH FREQUENCY CURRENTS IN THE TREATMENT OF CERTAIN DISEASES.

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It is with a desire to record a few facts and the result of some clinical studies extending over a period of two years that this article is presented for your consideration. The so-called current of high frequency and high potential is at present little understood and less appreciated. Some of its results are striking.

It may not be amiss to speak first concerning the current itself, its methods of generation and its application. Most physicians are aware that the electric force or current produced from the rapidly revolving plates of a static machine is one of great intensity, with an exceedingly high electro-motive force or voltage, but that it has small *volume* or *amperage*. That one can stand the static current with its fifty thousand or more volts seems almost incredulous to the lay member, but this passes into the domain of wonder and amazement when the current is "transformed or stepped up." This process of transformation or stepping up is brought about by causing the current to pass through a coil of coarse wire, which induces a current of higher potential in a secondary coil. Too frequently medical and lay minds associate danger with the question of voltage, but voltage without amperage produces a current freed from all the dangers associated by the lay mind with currents of high voltage. In this "step or transformation" the current induced in the secondary coil is one of great current alternation. The primary sources of energy from the high-frequency current may be obtained are as follows:

1. The static machine.
2. The induction coil.
3. The commercial alternating current.
4. The Tesla coil.

Of these sources of primary energy, physicians need only consider the first three, and especially the first two, the static and coil. It does not matter whether the primary source of

energy is taken from the coil or static machine, for in its transformation the primary energy is so changed from either of them, that it is the same current delivered to the patient. From a radical standpoint a therapeutic apparatus is placed in the hands of X-ray and static workers that will add very materially to their resources.

In its application special electrodes have been designed with a view to administering the current. These are practically of two kinds, one of them a section of glass tubing lined with tin-foil and attached to an insulated or vulcanite handle, with a proper connecton for the conducting cord; the other is the well-known low-vacuum electrode, so shaped as to be adapted in its application to external or internal surfaces of the body. Starting the machine in action an electrode is connected with one of the terminals of the secondary coil and brought near the surface it is desired to influence; when the electrode is near enough to the surface a spark jumps from the electrode and impinges upon the body. From an æsthetic standpoint there is no more beautiful discharge than from a low-vacuum high-frequency electrode. This stream or current, of a beautiful bluish violet color, frequently sets up an apple-green phosphorescence where the stream strikes the glass wall of the electrode. Especial note should be taken that a single exciting pole is used which may be either positive or negative, the polar conditions being merely that the positive exhibits a little sharper or needle sparks, while the negative possesses a soft breeze effect. The application of this current is painless provided the tissues covering bony structures are not too thin; for example, it produces a slight discomfort when applied to the forehead, but none when applied to an extremity. This, of course is speaking in general terms, and the high frequency does not vary in this respect from the well-known action of other currents, namely, increasing the area, diminishes sensation, restricting the area increases it: a practical example of which is, if we grasp the tube with the entire hand no pain results, but applied to a single finger tip, the stronger and denser action gives some little pain.

The physiological action of currents of high frequency are marked, and where it is properly applied productive of excellent results. It may be here stated that though this current is painless, it is not altogether harmless on that account. Bor-

dier and LeCompt, in a report to the Académie des Sciences, of Paris, found by experiments that currents of high frequency, even though painless when applied to human beings, may destroy the life of small animals. When applied to animals by means of metallic collars, one about the abdomen, the other about the throat, paralysis and death followed a few days later, but when electrodes were applied, one in the mouth, and the other in the rectum, death occurred in a few minutes, a rabbit being killed in fifteen minutes, a guinea-pig in seven, and a rat in forty seconds. D'Arsonval observed similar effects. Therefore carelessly applied to the human subject, currents of high frequency may produce untoward results, and should not be indiscriminately and thoughtlessly applied to the human subject, but discretion must be exercised. The oscillations, as a rule, are of such frequency as to produce no impression upon the motor and sensory nerves, although I have observed muscular contractions when the electrode is quickly and promptly brought in contact with motor points. Its influence over the circulation is noticeable and an intense vascularization of the skin takes place during the time of application. This is true in localized application as well as in the general systemic effects to be mentioned later where the solenoid is used. These currents thus produce active fluxion of the blood to the skin and unquestionably favor oxidation and metabolism in all its different forms and phases; as is shown by increased elimination of waste products and the taking on of flesh. Its action upon lowly organized bodies, such as micro-organisms, is peculiar and striking, and it is principally in this direction that the researches to be mentioned have been made.

Case I.—Miss M., aged thirty-eight, a neurasthenic of a number of years duration, was making a very satisfactory, though slow, improvement under the general application of massage, baths, rest, etc. She has been very anæmic and run down for several years and has had two previous attacks of paronychia of a phlegmonous character. For several days she complained of the classic symptoms of pus formation in the left thumb, and about the seventh day presented herself with a small abscess the size of a large pea. This was evacuated and dressed dry. The high-frequency current was applied for five minutes, using a vacuum electrode attached to the positive pole. The pain was relieved before the sitting was finished,

and to my surprise, upon removing the dressing next day, pus formation had ceased and only a watery discharge was present. She made an uninterrupted recovery within five days, healing having practically taken place.

Case II.—Miss L., a neurasthenic with marked gastric dilatation and lithæmic symptoms. While under treatment gave every evidence of commencing bone felon. Remembering the marked influence the high frequency had over pus formation in the previous case, the current was applied for five minutes daily, the result being prevention and complete recovery. Number of treatments, seven.

Case III.—Mrs. H., marked dyspeptic of atonic type; intensely gouty. A large boil developed upon the nucha, same having reached the purulent stage before seen by me. Pus being present it was promptly evacuated and the high-frequency current, by means of the vacuum electrode, applied for five minutes daily; prompt restoration taking place.

Case IV.—Mr. H., a student, neurasthenic with marked depression and phobias. Had been under treatment for two months, making marked gains in weight, hemoglobine, and general nerve tone, but troubled with large acne pustules. The persistent and careful application of the high-frequency current to these pustules not only checked their formation, but relieved the induration and improved the general condition of the skin.

Case V.—Mr. Y., sciatica of arthritic character, developed small ulcer of the right leg. Application of the high frequency brought about prompt granulation and steady healing.

Case VI.—Mr. K. Suffering with gastric dilatation and hyperchlorhydria, had a recurring attack of eczema upon the left forearm. Application of the high frequency every other day for two weeks promptly relieved the affection.

Case VII.—Mr. A. M., aged twenty-seven, marked neurasthenic and suffering from the severest vasomotor ataxia that it has ever been my lot to observe, called my attention to an intense itching located in both legs over the tibia. There was no external evidence of any dermal irritation or eruption and I concluded it was purely nervous in origin. The trouble was so intense and the itching so disagreeable he insisted upon some local means of relief. A mentholated powder and a lotion gave no relief. The first application of the high fre-

quency for five minutes to each limb checked the itching and gave relief for six hours. Eight or ten applications resulted in permanent relief.

Case VIII.—Miss S., aged thirty-six neurasthenic with gastric dilatation, fermentation and hyperchlorhydria, while under treatment for these troubles developed a pruritis of an exceedingly disagreeable character. The application of the high-frequency current promptly relieved the condition.

Case IX.—Miss E., one of the most marked lithæmic cases I have ever seen. Has been under my care the past eight or ten years, off and on, for gastric, renal, and nervous phenomena arising from this condition. She developed a spot a little larger than a dollar to the right of the spine, just below the right shoulder blade. The application of the static and galvanic currents which had heretofore given her satisfactory results absolutely failed. Persistent applications of fomentations, douches, and general hydrotherapeutic measures improved the general condition, but failed to phase the pain. At this time an X-ray examination was made and nothing discovered. An application of the high frequency was then made with the result that inside of two weeks relief was obtained and freedom from pain lasting until the present month, when she returned again for treatment and the high frequency gave her immediate and positive relief.

Case X.—Mrs. G., gouty, having suffered from various arthritic manifestations for the past ten years, during which time she has been under my care off and on. She developed an acute inflammatory condition of the right thumb; hot, swollen, throbbing, and painful. General hydrotherapeutic applications were made and the local application of the high frequency to the gouty deposit. Its anæsthetic action was similar to cocaine upon a mucous membrane. Marked vascularization of a pink healthy color, together with local perspiration, followed each application and in two weeks relief of the local pain and swelling was obtained. General hydrotherapy was used.

Case XI.—Mr. F., lawyer, very nervous and anæmic, complicated with a mitral insufficiency. He was taking general massage, and electrical treatment and a special course of baths, and graduated exercises for the heart disease, by means of which I am happy to say he was restored to health and the organic cardiac disease cured. During his stay here he developed a

small ulcer at the root of the gums, which resisted every local application, including a thorough cauterization by nitrate of silver. While a little thing, it was exceedingly painful and annoying, and to one in his nervous condition, materially interfered with mastication and food consumption. The application of the high-frequency current very promptly relieved the trouble.

The action of the current in these cases and the results obtained are, in my opinion, due to three causes: first, the electrical bombardment of percussion, stimulating the nervous mechanism; second, the active circulation produced at the point of application; and third, to the presence of the violet rays.

I feel satisfied from clinical observation that the action of the high-frequency current upon pus and pus-forming bacteria is germicidal in proportion to the presence of the ultra-violet ray. One should thoroughly satisfy themselves that these rays are present, and this can be easily determined by the use of the mineral, known as Willemite (Zn, Si, O_4) better known as the silicate of zinc. When this mineral is exposed to the ultra-violet rays it gives a beautiful greenish fluorescence. It has been determined that the ultra-violet ray will not penetrate glass, so that if Willemite fluoresces and the introduction of a thin piece of glass (a cover glass will do) between the rays and the mineral checks the fluorescence we may know that we have to deal with the true ultra-violet ray. I mention this test because there are, upon the market, at the present time, apparatus purporting to give the ultra-violet ray and which signally failed to do so. I have not mentioned the action of ozone produced by the electrical bombardment brought about by the disassociation of oxygen atoms, and their rearrangement as ozone. It is these chemic or actinic rays that produce the prompt and rapid destruction of micro-organisms and their toxins. Its action in the cases of pain are to be explained by the electrical bombardment, sedation of nerve structures and the stimulation of circulation.

The writer is now experimenting and gathering clinical data with regard to direct action of the violet rays *alone*, in these cases, and hopes to be able in the course of the next twelve months to present for further consideration some clinical and scientific material that he hopes will prove of interest and practical utility.

RADIUM.

BY SAMUEL G. TRACY, B. S., M. D., NEW YORK.

The scientific and medical world is now deeply interested in this new, rare, and wonderful substance known as radium. As yet radium has not been isolated as a metal, but is produced as a chemical, either as a bromide or a chloride. It is obtained from pitchblende, a comparatively rare ore. Up to the present time it has been found in rare quantities in Bohemia, Saxony, Caldwell, England, and Colorado and Texas in the United States. Over a hundred years ago Klaproth, a German chemist, separated uranium from pitchblende, and its salts have been used in medicine and the arts ever since. However, it remained for Becquerel, a noted French chemist, to discover that uranium had certain properties similar to the X-rays. In 1896 he left a photographic plate (upon the top of which rested a key) exposed for several days to uranium. When he developed the plate he found the shadow of the key. It appears that uranium sent out certain radiations which decomposed the silver salt on the photographic plate. These rays are now called Becquerel rays.

Following along this line of experimentation come the investigations of Professors Pierre and Madame Curie of Paris. In making a photographic experiment with the Becquerel rays, using a superior specimen of the ore pitchblende as an excitant, they found that the radioactivity of it is four times as great as any preparation of uranium they had previously used. In making this estimate they took uranium for a standard, hence they concluded there must be some substance in the pitchblende other than uranium. Their surmise was eventually verified, for after two years of painstaking experimentation they first (in 1898) discovered polonium, a radioactive substance named in honor of the native country (Poland) of Madame Curie. In 1899 radium was discovered, but in exceedingly minute quantities. In fact, it has been said that radium is as rare in pitchblende as gold is in sea-water, for it takes one ton of pitchblende to supply one grain of radium. From the above data one can realize that radium is a very rare and expensive substance. Chemically pure radium is now manufactured by

* Read before the Clinical Society of the New York School of Physical Therapeutics, October 23, 1903.

the Société Centrale of Paris at \$600 a grain, or \$4,000,000 a pound. The German * preparation manufactured in Hamburg at the laboratory of Dr. Richard Sthamer is just as active and not quite as expensive.

PHYSICAL PROPERTIES.

Professor Curie states that radium has a radioactivity one million times greater than uranium, and emits the same number of Becquerel rays at 300° below zero as it does in the ordinary temperature. Upon experiment he found that radium maintains its own temperature of from 2 to 3°F. above the surrounding air. This was confirmed by Laborde, and is equal to stating that radium gives off sufficient heat to melt its own weight of ice every hour. A remarkable phenomenon about this is that this evolution of heat is going on constantly without any apparent source, and for an indefinite period, leaving the radium at the end of several months' use as potent as it was at the beginning. Even after long periods of activity radium shows no microscopical, spectroscopical, or chemical change; in fact its weight remains the same. These statements have been verified by Becquerel and Curie of Paris, Sir William Crookes and Lord Kelvin of England, Rutherford and Soddy of Canada, and William J. Hammer of New York. Radium has some of the properties of the X-rays and emits three forms of rays. They are described by Sir William Crookes as (1) those identical with cathode rays—free electrons—or matter in ultra gaseous state; (2) rays of true atoms positively electrified—large bodies compared with the former—and make the air a good conductor of electricity—act on photographic plates, but are easily checked by passing through material obstructions; (3) rays which are very penetrating and thought to be identical with the Roentgen rays.

The first and third groups act strongly on platino barium cyanide and some other substances, causing them to become strongly fluorescent.†

* Hugo Sieber of New York imported the German preparation for me.

† Tyndall says when non-visual waves are caused to impinge on molecules of certain substances (quinine sulphate, for instance) they compel those molecules to vibrate and the vibrations thus set up are of slower period than those of the exciting waves. By this lowering of the rate of vibration through the intermediation of the substance acted upon the invisible rays are rendered visible and thus we have fluorescence.

The source of this heat and other radiant energy is a mystery to all scientists. Curie speculates upon two hypotheses: (1) As the atoms of radium are evolved they are transformed and this transformation produces heat. The second hypothesis consists of the supposition that radium is capable of capturing and utilizing some radiations of an unknown nature which cross the space without our knowledge. Radium rays in some respects resemble X-rays. They penetrate opaque substances and decompose silver salts on a photographic plate; they take a much longer time, however, to take a photograph similar to an X-ray picture. (See Figs. 1, 2, 3 and 4.)

PHYSIOLOGICAL PROPERTIES OF RADIUM.

It has been found by Curie, Walkoff, Giesel, Soddy, and Hammer that the radium rays have a powerful physiological effect. If a glass tube containing radium is left in the vest pocket for an hour, a slight dermatitis appears, followed in ten days or two weeks by the appearance of a burn. If the radium tube is kept next to the skin or in the pocket for several hours, it will produce a burn, but its full physiological effect will not be felt for a fortnight. In the latter case an ulceration may occur which may take from several weeks to several months to heal. If a tube is attached to the back of a mouse it will die in twenty-four hours, and if radium is inserted beneath the skin of the same animal it will result fatally in a much shorter time. Becquerel exposed various kinds of seeds to the radium rays, and they lost their germinating power.

Professor Curie showed that radium under some conditions could by its radiation produce death in some of the lower forms of animal and vegetable life. In May, 1903, he suspended about one grain of radium in the cage of eight mice; the tube of radium was removed at the end of three days. The mice showed no effect for four or five days, when it was first noticed that their fur began to fall out, then they gradually became blind and they all died in from ten to thirty days after exposure.

Another physiological observation is noted by Giesel, who pointed out that when radium salts were brought near the closed eyes or touched to the eyelids of the blind, that a sensation of light was produced. I have verified this in a case of blindness from optic nerve atrophy, and also personally upon my own eyes.

BACTERIOLOGICAL EXPERIMENTS WITH RADIUM.

As yet there have been few reports of the bacteriological effects of radium. However, from the experiments which have been made there is conclusive proof that the radium rays have marked bactericidal properties. In Italy, Caspari and Ashkassi exposed culture tubes of the micrococcus prodigiosus to radium, which had a fatal effect on the organism in three hours. In Germany, R. Pfeiffer and E. Friedenberger reported (in the *Bliner Klinische Wochenschrift*) that cultures of typhoid and cholera bacilli were either killed or markedly inhibited when exposed to radium rays (at 1 c. cm. distance) for a period of 48 hours. In England, Mr. Henry Crookes reports that bacilli liquifaciens, bacilli coli communis, and bacilli prodigiosus were exposed to the action of 10 milligrams of radium through a mica screen at a distance of about 1 inch from the culture plate; after having been subjected to the action of the radium for several hours it was found in almost every case that the microbes were killed.

USES OF RADIUM IN MEDICINE.

It has been proved to the satisfaction of medical men who have been testing the salts of radium that their radiations have a positive effect on diseased tissues, and even at this early stage of experimentation it certainly looks as though their use were indicated in lupus and other forms of tuberculosis, rodent ulcer, superficial cancer, and some cases of deep cancer; in chronic skin diseases, atrophy of the optic nerve, and blindness from other causes. Deep-seated cancers have not as a rule been treated successfully by the X-rays. In radium rays it seems as though we have a new agent which is more likely to give better results in some of the cases which have heretofore been considered incurable. In treating these deep-seated affections radium rays can be applied locally or through their emanations to the seat of the disease, thus having a distinct advantage over the X-rays. From the cases which I have treated and from the reports of cases which I have collected, I think there is sufficient encouragement to make us feel that we are on the right road to find a specific cure for cancer and tuberculosis.

REPORT OF CASES.

Dr. John McIntyre reports two cases treated by radium rays. The first was a case of lupus of the hand which was rayed daily (twenty minutes) for three weeks, in which time the lesion was healed. The second was a lupus of the nose. She had the same daily treatment and was cured in four weeks. Dr. Oudin of Paris reports the cure of several cases of lupus by radium rays. Professor Gassenbaurer of St. Petersburg reports to the Vienna Medical Society no less than twenty cases of cancer treated by radium during the six months ending July 1st. All these patients showed more or less improvement, and the two whose history I now give were cured.

Case I.—Male, aged thirty-seven years; operated on eight years ago for melanosarcoma of the left arm. He recently returned to the clinic because of a multiple recurrence of the same. The numerous nodules were exposed to the radium rays for twenty-five minutes each day or two, depending upon the skin reaction, and the cancerous nodule disappeared in one month.

Case II.—Male, aged sixty-one years; operated on for cancer of the mouth in 1888, 1891, and 1897, respectively. He presented himself at the clinic again in April, 1903, with an inoperable cancer of the lip and palate. Radium was used as in the above case, and the cancerous growth disappeared with complete healing in five weeks.

The case whose history I now present is one who has not been under my treatment a sufficient length of time to say he is cured, but the action of the radium rays thus far is such as to expect a cure.

Case I.—Epithelioma of the neck. Male, aged 40; twelve years ago on account of a mole on the back of his neck irritated by the collar band, a small sore was produced. This growth has been present ever since, growing from the size of a bean to its present size which is 1 1-2 inches wide and 2 1-2 inches long. During the past twelve years he has had various forms of treatment, including arsenical paste, but with negative results. October 29, the growth was the size given above, elevated about 1-4 to 1-2 inch above the surrounding parts. It was covered with a hard crust and the edges were much indurated. At this time the growth was exposed to radium rays. A tube

of radium 10 milligrams of 300,000 radioactivity was held in a tubeholder over center of the growth about 1 inch distant. These exposures were continued three times a week and lasted from fifteen to twenty minutes. After the first treatment the patient had slight pain in and around the edge of the growth and extending to the glands of the neck. The edges which had been hard were now softer and the surface of the growth flatter. After a week's treatment the growth became softer and certain of the foci markedly broken down with a tendency to slough and some destruction of tissue. Although but a short time has elapsed there has been improvement in the epithelioma and the cure is expected.

Case II.—Psoriasis. Female, aged 22. Has had psoriasis for twelve years. Began on the tips of the fingers, extended to the palms and backs of the hands; later to the arms and some parts of her body. Of the numerous spots one on the back of her left hand was selected for radium treatment. This spot covered an area of about two inches in diameter. A tube containing 1 gram of radium and barium of 15,000 radioactivity was used. It was supported about one inch above the back of the hand for a period of twenty minutes twice a week. After two weeks' treatment there was a marked improvement, indicated by a gradual fading and scaling of the spots. She is still under treatment.

POSSIBILITIES OF RADIUM RAYS IN BLINDNESS.

There are those among the blind who can distinguish light from darkness, and even locate the direction of the light. Certainly in these cases the optic nerve and retina receive partial impressions. Now, Giesel observed the interesting phenomena which I have already pointed out, that when a tube of radium touched the eyelids of the closed eyes a sensation of light was produced. Who can tell but that this manifestation may be found useful in stimulating the optic nerve into activity and perhaps holding out encouragement to those who are blind but still retain the power to distinguish light from darkness? Dr. Lunden of Berlin in a recent report affirms that he obtained good results from radium in the case of two boys who were almost totally blind. While these boys (at the time of the report) were not cured, it was found after several treatments that they were able to see shadows of objects that they were

not able to see before. William J. Hammer of New York reports the case of Lily S., aged 11 years. Blind for eight years. She could not distinguish the brightest kind of a light, as burning magnesium. After only one treatment she could recognize a very powerful light and recognize shadows of objects not hitherto perceived. Enough treatment and sufficient time have not elapsed to say whether she will receive permanent benefit. The following case has been under my treatment only ten days, but even in this short time the results have been such as to make me look for marked improvement and perhaps a partial restoration of vision.

Case I.—Male, aged 52. Has had optic atrophy for four years. No specific history. His blindness began gradually and ended with complete loss of vision, with the exception of his ability to distinguish light from darkness. October 29, the right eye was exposed to radium of 300,000 radioactivity. At the first treatment the tube was held 1-2 inch from the eye for two minutes. Almost immediately the patient experienced a luminosity in his eye. After this I rubbed the eyelid over the closed eye, say half a dozen times with the tube containing the radium, and the patient said he perceived flashes of light. He described it as a pale sheet lightning. The luminosity remained in his eye for half an hour. He received this treatment three times a week with longer periods of exposure (from four to six minutes). November 2, after receiving treatment he was tested with playing cards—the three spot of spades and the three-spot of clubs. After one or two minutes and considerable change of focus he recognized and called each card correctly. In coming to a conclusion as to which card he had in his hand, he found it necessary to hold the card in a certain position about two feet from the eye, and only one spot came into view at a time. To make out the other spots he had to move the card. November 9th. Same treatment as before, but only for three minutes. He stated as before that his eyes became luminous and the room was brighter, and he could distinguish the outline of a black picture frame on the wall about seven feet distant. He is still under treatment, and only time and sufficient treatments will prove whether he will receive permanent improvement.

Perhaps the foregoing reports are somewhat rosy colored in their expectations; on the other hand, they may be in some

respects not sufficiently extravagant—time will tell. However, to the inexperienced it is well not to draw unwarrantable conclusions concerning this wonderful substance, and to imagine that in radium we have a specific for all incurable diseases. No doubt, in time, scientific experimentation will show its value as a remedy, and perhaps reveal its mysteries, and the natural laws through which it works.

In closing, I wish to express my appreciation for the assistance I have received from that well recognized authority on radium, Mr. William J. Hammer, of New York.

240 West One Hundred and Second Street.

After the reading of his paper, Dr. Tracy exhibited specimens of radium of three grades of radioactivity. (1) Three hundred thousand, (2) eighteen thousand, and (3) a combination of willamite and radium, which showed the characteristic fluorescence.

Discussion.

Dr. Grad: I thought that there was no six hundred thousand radioactivity. I thought seven thousand to be the greatest.

Dr. Snow: Dr. Cleaves has been using radium in the clinic of the school, and with very positive and striking results.

We are still learning the effects of the X-ray and the place of radium is of interest to all. Whether its effects are due to germ action or vibration time will solve.

Dr. Brinkmann: The product of one ton of uranium residual is two pounds and of uranium residue is one pound. Owing to its effect on photographic plates in a mine in this country, sensitized plates are placed around, and thus assist in the selection of uranium, so I think that in the future the price of uranium will be reduced.

Dr. Tracy: I wish to thank you for your attention, and I am glad to learn that radium is used in this Institution. In the study of the subject, we shall no doubt have to sift the wheat from the chaff by degrees.

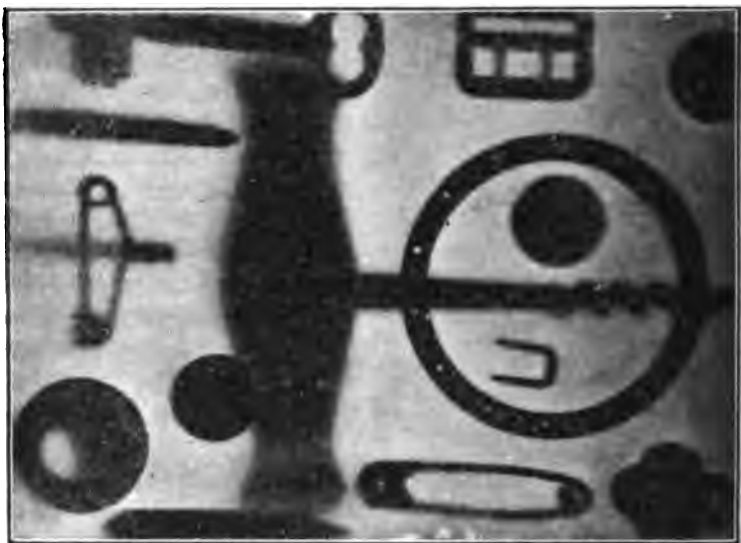


Fig. 1.—Radiograph taken with radium bromide, 10 milligrams; radioactivity, 300,000; distance from plate, 3 inches; time of exposure, 10 hours. Stanley plate used, which was covered by thick black paper, on which rested the objects here radiographed.



Fig. 2.—Radiograph of chicken's foot, taken with radium bromide, 10 milligrams; radioactivity, 300,000; radium tube distance from plate, 3 inches; time of exposure, 18 hours. Photographic plate prepared as in Fig. 1.

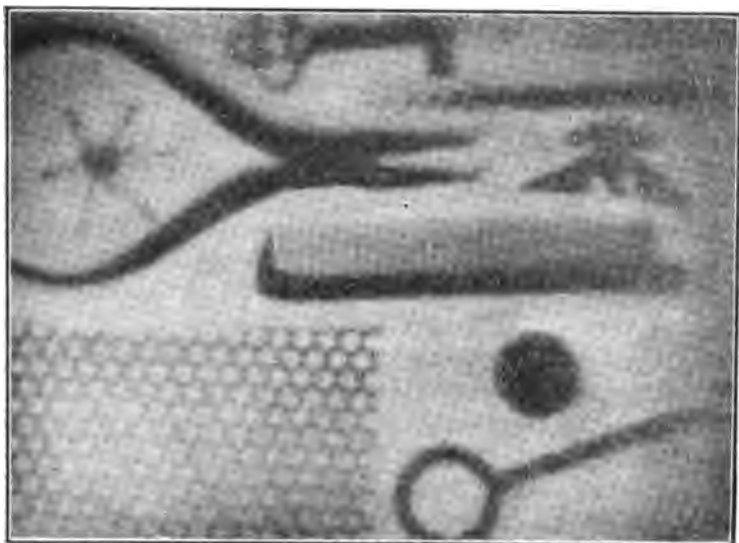


Fig. 3.—Radiograph taken with 10 milligrams of radium; radioactivity, 300,000; distance from plate, 3 inches; time of exposure, 18 hours. Stanley plate used and *inserted inside* of plate-holder, upon which rested the objects here pictured.

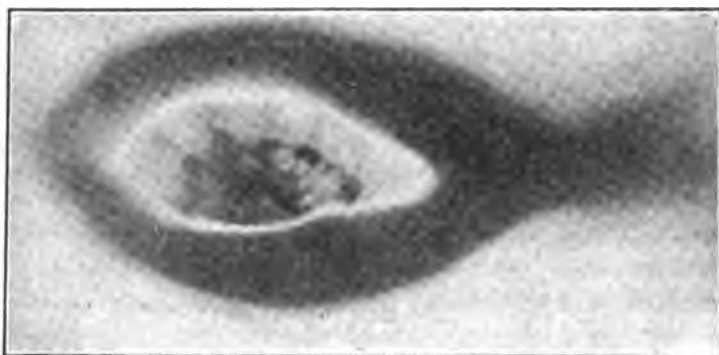


Fig. 4.—Radiograph of a perch, taken with radium of 300,000 radioactivity held 3 inches above the plate; time of exposure 18 hours; upon the body. An additional tube of one gram of radium, and barium bromide of 15,000 radioactivity was laid on the body of the fish for four hours. The action of this tube shows the area of radiation, and its power of penetration.

Editorial.

THOSE WHO HAVE USED AND CEASED TO USE ELECTRICITY IN THERAPEUTICS.

WE hear it frequently said by older men that they have used electricity but found it useless and abandoned it. One will say. "I adopted Apostoli's methods and abandoned them as useless." Another that, "I have used static electricity but found that it only gave temporary relief and did not cure my patients and so abandoned it." Others say 'I find surgery far more profitable and therefore no longer use electricity.'

Of the first who employed Apostoli's method and abandoned it are probably many of the older surgeons who having had no previous experience whatever in the use of electricity and having read Apostoli's technique without learning his methods or the fundamental principles of the employment of electricity, did injury to their patients and forever cursed or condemned it. Others of the same sort, employed Newman's method without a milliamperemeter or without having acquired a skillful touch, and seriously injured their patients as did the followers of Apostoli. This is what might have been expected.

Of those who speak of having employed static electricity and say that it gave but temporary relief, are those too who failed to employ it properly, because it seldom fails in the hands of those who understand it.

Those who have abandoned electricity in the treatment of cases to which they found it well adapted and adopted surgery, did so because they found it more profitable.

It is to be regretted that men ever undertook the employment of the continuous current who had not had scientific training from those who were masters of the subject, for had it been otherwise the science could not have been kept so long in abeyance. The same is true to-day of those who are using the static machine without the requisite training. In the latter case, however, no injury is likely to be done to the patients as has been done in the past by the novice who has

undertaken the use of the continuous current, for the static modalities do not cauterize tissue and thereby produce conditions which leave the patient the worse for treatment.

It is a notable fact, on the other hand, that few physicians who have scientifically employed electricity in their practice have rarely abandoned or condemned it. In fact, the better a man understands the use of any particular modality or current the better results he is able to obtain, and the more ardent he becomes in its advocacy if he has properly understood his subject.

The necessity of a proper knowledge of the actions by those who undertake it, at this time, naturally follows from the experience of the past, and more scientific men of the abler class of physicians are taking courses of instruction and looking to a scientific employment of this valuable agent than ever before in the history of the subject.

* * *

EDITORIAL CHANGE.

WE are pleased to announce that the vacancy made in the department of Psycho-therapy in the JOURNAL by the death of Dr. Pilgrim, has been assumed by Dr. Leslie Meacham of the Cornell Medical College and Professor of Psycho-therapy in the New York School of Physical Therapeutics. The doctor's wide experience in this department of therapeutics ably qualifies him for the position, and the editor and readers of the JOURNAL are to be congratulated upon this addition to the staff.

* * *

MEETING OF THE CLINICAL SOCIETY OF THE NEW YORK SCHOOL OF PHYSICAL THERAPEUTICS.

At the next regular meeting of the Clinical Society of the New York School of Physical Therapeutics to be held at the School, 465 Lexington Avenue, on Friday evening, December 18, 1903, Dr. Margaret A. Cleaves, Professor of Phototherapy will read a paper on The Physiological Action of Light and the Physical Factors in Phototherapy.

The paper of the evening will be followed by an exhibition of modern apparatus used in Phototherapy.

STANDING COMMITTEES OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION FOR 1903-1904.

Special Committee elected by the Association to consider the advisability of affiliation of this body with the American Medical Association: Clarence Edward Skinner, Chairman, New Haven, Conn.; Francis Besant Bishop, Washington, D. C.; Frederick Harris Morse, Melrose, Mass.

The following committees are announced by the President of the Association, Dr. A. D. Rockwell.

On Induction Coils and Alternators.—F. B. Bishop, M. D., Chairman, Washington, D. C.; A. E. Kennelly, F. R. A. S., Cambridge, Mass.; R. H. Boggs, M. D., Pittsburg, Pa.

Radiant Energy; Including Apparatus and Means for the Diagnostic and Therapeutic Uses of Light; the Roentgen Ray and Radium Radiations.—Margaret A. Cleaves, M. D., Chairman, 79 Madison Avenue, New York, N. Y.; T. D. Crothers, M. D., Hartford, Conn.; Samuel Sheldon, A. B., A. M., Ph. D., Brooklyn, N. Y.

On Electrodes.—R. G. Brown, E. E., Chairman, 158 Montague Street, Brooklyn, N. Y.; W. H. White, M. D., Boston, Mass.; C. H. Lodor, A. M., M. D., Chicago, Ill.

On Meters.—Robert Reyburn, M. D., Chairman, 714 13th Street, Washington, D. C.; Charles T. Scott, M. A. I., E. E., Pittsburg, Pa.; Morris W. Brinkmann, M. D., New York, N. Y.

On Cataphoresis.—F. H. Morse, M. D., Chairman, Melrose, Mass.; M. T. Wheatland, M. D., Newport, R. I.; Tremont Pease, M. D., Norwood, N. Y.

On Static Machines and Condensers.—William Benham Snow, M. D., Chairman, 465 Lexington Avenue, New York, N. Y.; Willis Parsons Spring, A. B., M. D., Minneapolis, Minn.; G. Betton Massey, M. D., 201-3-5 Professional Building, Philadelphia, Pa.

On the Constant Current Generators and Controllers.—Wm. J. Herdman, M. D., LL. D., Chairman, 38 East Huron Street, Ann Arbor, Mich.; Daniel R. Brower, M. D., LL.D., Chicago, Ill.; Lucy Hall-Brown, M. D., 158 Montague Street, Brooklyn, N. Y.

On Current Classification and Nomenclature.—Wm. J. Jenks, E. E., Chairman, 120 Broadway, New York, N. Y.; Elihu Thomson, A. M., Ph. D., Lynn, Mass.; Samuel Sheldon, A. B., A. M., Ph. D.; Charles L. Clark, Bronx Borough, New York.

On the St. Louis Exposition in 1904.—William Benham Snow, M. D., Chairman, 465 Lexington Avenue, New York, N. Y.; Wm. J. Morton, M. D., 19 East 28th Street, New York, N. Y.; W. E. Goldsborough, M. E., Lafayette, Ind.; Daniel R. Brower, M. D., LL. D., Chicago, Ill.; R. G. Brown, Brooklyn, N. Y.

Progress in Physical Therapeutics.

LARYNGOLOGY, RHINOLOGY, AND OTOLOGY.

EDITED BY W. SCHEPPEGRELL, A. M., M. D.

Affections of the Upper Air Passage of Malarial Origin.

The influence of the plasmodium of malarial fever on the upper air passages has thus far not been fully recognized, and it is only recently that its etiologic influence on this part of the body has been appreciated. In this connection the observations of L. Sverzhenski (Medizinskoe Obozryenie, Moscow; Journal Amer. Med. Ass'n, June 6, 1903) are of interest. Coryza, cough, bronchitis, and pleuritis have been observed in malarial districts, evidently due exclusively to the infection, as they were cured by quinine and were rebellious to other measures, including the usual expectorants. In the four cases described the first patient was a man aged 46, with a severe, dry, spasmodic cough and malarial parasites in the blood, with a tendency to dyspnoea and a sensation of oppression in the chest. The second patient complained of coryza, cough, and fever, all the symptoms vanishing under quinine. The third patient presented symptoms of sudden pleuritis, vanishing with equal suddenness on exhibition of quinine. In the fourth patient the parenchyma of the lung was involved. These affections are observed most frequently in comparatively young persons residing in or recently arrived from malarial districts. The malarial coryza is distinguished by the marked variations in the morbid symptoms in the course of a single day. The nasal mucosa is red, dry, and tender, or the symptoms may be those of hay-fever. The cough is like a "nervous cough." The bronchitis may be catarrhal or "dry," the cough resembling that of pertussis. The diagnosis of the malarial origin is not difficult if the possibility occurs to the physician, and the rapid cure under quinine confirms it. Sferzhenski does not attribute these malarial manifestations to local toxic action but to the intermediation of the nervous system.

Prolonged Intubation Tubes.

The advantage of intubation over tracheotomy is now so generally conceded that the latter is now adopted in cases of diphtheria only in those rare cases in which intubation is unsuccessful in relieving the patient.

In considering this subject Shurley (Journal Amer. Med. Ass'n, July 11, 1903) offers the following conclusions:

Cases requiring a tube more than six days should be classified as prolonged. Rubber tubes only should be used.

Liberal doses of antitoxin are required in cases due to re-

infection or persistence of the membrane. Large doses of strychnine are of value.

Smaller or modified tubes coated with alum ointment or alum gelatin should be introduced at each reintubation.

The string may be left in place with advantage in many cases. When these measures fail, the "granulation tube" may be used. Tracheotomy is never indicated.

Tonsilectomy.

In view of the fact that even the remotest disease of the tonsils may develop tonsillitis and even more grave conditions, the tendency at present is to perform tonsilectomy, that is the entire removal of the gland, where it can be demonstrated that the whole organ is diseased.

In this connection Lautenbach (Pennsylvania Med. Jour. Amer. Med. Ass'n, July 18, 1903) holds that enlarged tonsils are always a menace to health, and unless there are unusual complications, should be removed. The operation is not difficult and seldom has serious results. It is attended with increased health, better respiration and improved digestive function; there is less liability to microbic disease, especially diphtheria, and the nasal catarrh will be improved. The lymphoid structures in the pharynx will disappear; the tendency to ear disease is diminished and there will be no more tonsilitis.

GYNECOLOGY AND APPLIED METALLIC ELECTROLYSIS.

BY G. BETTON MASSEY, M. D., PHILADELPHIA, PA.

Cure of Rodent Cancer by Electrolysis.

W. R. Fox (Australasian Med. Gaz., June, 1902, quoted by Charlotte Med. Jour., April, 1903), gives an account of this operation, and details of a case upon which he successfully operated. Referring to its disputed nature, he gives twelve of the different names by which it has been known. It stands upon the border-line of cancer, being locally of great malignancy, but never causing secondary deposits. Paget, Billroth, Bryant, Quain, and others class it among cancers. Histologically, Bayne considers that it closely resembles flat-celled epithelioma, but differs in origin. Its local action, though slow, is as remorseless as the worst forms of cancer. Of the three new methods of treatment, namely, the destruction of the growth by electrolysis, application of the Finsen light, and of the X-rays, the first only, that by electrolysis, is dealt with in this paper. Stohrer's bichromate battery is used, with a potential of 160 volts, and the voltage can be increased by pushing the sledge along to the required point. The two wires are attached each to a holder containing a platinum needle. A switch is placed in one of the handles by which the current is turned on or off. A milliamperemeter of the "dead beat" variety is

used to give a reading instantly. A current of from 300 to 1000 milliamperes should be employed. Under anæsthesia the needles are inserted into the healthy tissue on one side of the growth, or half an inch apart; a current of 40 or 50 volts is switched on and the milliamperemeter read. The current is kept on for one or two seconds only, then interrupted and reversed, and again sent through in the opposite direction for one or two seconds. The current must be increased until the necessary effect is produced. This effect is made evident by a striking and instant change of color of the soft tissues between the needles. They become yellowish white, all circulation in them having ceased; they are in fact dead. One needle is then withdrawn and reinserted a similar distance on the opposite side of the other needle, so as to take up a fresh piece of tissue, and this is destroyed in the same manner, and so on until the growth is completely encircled and the whole of the invaded tissue destroyed. The slough separates in from three to six days, healthy granulations cover the remaining cavity and quickly fill it up, a scar only remaining. The after treatment consists simply in aiding the separation of the slough and in keeping the wound clean. Fox used a current considerably beyond 1000 milliamperes in the case described, causing spasmodic contraction of all the muscles of the body. Though he considers there is no danger in using such a current, he recommends ether or A. C. E. mixture as the anæsthetic under such circumstances. He claims that electricity has important advantages over the three old methods of treatment, namely, excision, the application of powerful caustics, and escharotics. It is free from the intense pain caused by cautery or escharotics; after electricity there is no pain whatever; it is also a more efficient operation. There is no hemorrhage, and therefore it is easy to avoid removing more healthy tissue than absolutely necessary. The possible contamination of the surrounding healthy parts by a knife which has just passed through invaded tissue is avoided. No sutures are required, and therefore their consequent irritation which may be a factor in causing the disease to return is absent. The cicatrix is less than after excision, as is also probably the risk of recurrence.

[This article reads very much like a peep into the ancient history of electro-therapeutics to one conversant with the recent radiotherapy. It is, in fact, an abstract of a paper that appeared a year and a half ago. The process described is that of Inglis Parsons, of London, and, in the opinion of the editor, is far more severe than is ever necessary in such cases. If radiotherapy proves either too slow or too dangerous for these cases they can be cured with comparative ease by zinc-mercury cataphoresis, which would require a far less amperage than that

used by Fox in the case described, and would entirely avoid the dangerous and absurd shocks which were a useless part of the Parsons' method.

Zinc-mercury cataphoresis is so effective in rodent cancer of the face, in fact, that it is only a very extensive case that requires the massive application; the minor method, described in these columns some months ago in connection with the treatment of tuberculous glands, being quite capable of securing a cure if persisted in daily for some months. No anæsthesia save that produced locally by cocaine is necessary in the minor method, and the final scar is quite inconspicuous. G. B. M.]

PHOTOTHERAPY.

BY MARGARET A. CLEAVES, M. D., NEW YORK CITY.

Ultra-Violet Rays.

In defiance of the well-known physical law, that pure ultra-violet rays are not transmitted through glass, is the statement that vacuum tubes of glass, unipolar or bipolar, are an efficient source of ultra-violet radiations.

So far as is known the velocity of light is the same for all frequencies. In traveling through the ether that fills the interatomic and intermolecular spaces of transparent substances, such as glass, the velocity is not only reduced, but the intensity of the vibration is also reduced, differently for different frequencies; high frequencies being generally more reduced than low frequencies. It is because of this physical law that the use of screens of colored, or lenses of clear glass are to be avoided in the arrangement of any source of ultra-violet radiations for therapeutic work. The passage of the high frequency waves are thereby cut off to such an extent as to greatly reduce the beneficial results obtained. On the other hand, in their passage through quartz, the high frequency waves readily pass without much absorption; in other words it is transparent to the pure ultra-violet rays. In this physical fact is to be found the reason why these vacuum tubes of glass, however brilliantly they glow and hypnotize a credulous public, the profession even, are absolutely devoid of true ultra-violet radiations. Upon tests applied no different results were obtained in physical effects from an all glass tube and a similar tube with a quartz window. Instead of this being a conclusive proof that the ultra-violet rays passed through the glass, it simply suggests that the vibrations were not of the frequency or length characteristic of ultra violet, that is, that no ultra-violet rays were produced in the tube.

In his experiments, Nichols has proved that common window

glass, plate glass, flint glass, black, red, and uranium glass are not transparent to ultra-violet rays, i. e., for wave lengths less than 30 microcentimeters.

Willamite is commonly used by physicians in testing the light values of different forms of light apparatus. It fluoresces under the influence of X-rays, cathode rays, and ultra-violet rays. It is believed by physicists that it will fluoresce under other conditions; high frequency vibrations for example. It is only considered a conclusive test for the existence of ultra-violet rays, when used to locate the spectrum of a source of light which has been produced by means of a grating, or by quartz lenses and prisms.

The fact should not be lost sight of that glass is transparent to longer wave lengths, from 30 microcentimeters and upwards, and that these frequencies possess to a limited degree the properties of the higher frequencies. This is shown in photography and is also a matter of daily observation in the therapeutic uses of light. Glass is transparent to the blue violet or longer wave lengths, and they are valuable in therapeutics, but, so far as proven, not as valuable as ultra-violet rays.

In the interests of scientific progress no apparatus should be devised, manufactured, and sold under the name of ultra-violet ray, which does not give light frequencies of that value. All clinical evidence seems to indicate that light vibrations are useful in hygiene, sanitation, and therapeutics.

Radium.

The oxidizing action of radium rays as indicated by the decomposition of iodoform is being investigated by Hardy and Wilcox. They find that the β rays seem to be particularly active in this respect, but as several layers of glass and lead did not stop the effect, the γ rays also appear to be concerned. The physical state seems to be changed by the α rays; they coagulate electrically negative colloids, and dissolve colloids charged positively; positively; the β and γ rays produced chemical changes and oxidize tissues.*

In a paper before the Royal Society, England, Strutt, reports his experiments with the γ rays. These are the most intensely penetrating of radium rays and have been supposed to be identical with the Roentgen rays. Strutt found that they agree with the latter in not conveying an electric charge, in photographic and screen effects, and in ionizing power, but that they differ as regards their ionizing effects on various gases. This difference is so pronounced that Strutt feels justified in denying their identity with the Roentgen rays. He found a great difference, for example, in the case of carbon tetrachloride and methyl iodide. Radium rays of all kinds, according to this author, obey a different law from the Roentgen rays and are probably all of a corpuscular nature. That the β or

* London Engineering, August 28, 1903.

cathode rays produced γ or Roentgen rays by impact upon the radium itself, is unlikely, for quantitative reasons, since the current emitted in cathode rays by a square inch of intensely active radium is only 10" amperes, whereas the current through a focus tube is of the order of 10^2 amperes.*

In the study of the spectra of radium, Sir Wm. and Lady Huggins find, that all of the ultra violet radiations seem to be due to nitrogen; whether atmospheric nitrogen or nitrogen occluded by the radium, is an open question.

The lethal powers of the radium rays are not believed to be due to any novel or intense action, but to their greater penetrating power. It is because of this greater penetrating power that the hope of administering a lethal dose to a cancerous mass has been expressed. Should it prove destructive to cancer cells, then comes the question of using it without interfering with the vitality of normal tissue.

PSYCHO-THERAPY.

EDITED BY LESLIE MEACHAM, M. D.

An interesting feature of recent medical literature is the increasing recognition of a need for more light on mental therapy. A half-dozen recent exchanges contain articles of varying merit.

Psychic Force—A Therapeutic Power. By Henry S. Munroe, M. D., Americus, Ga., Kansas City Medical Index-Lancet, Oct., 1903.

Munroe takes for a text the definition that "Suggestion is an impression conveyed by any means of communication whatsoever from one mind to another." The goods and ills arising from suggestion are pointed out and he argues that "suggestion is but disguised hypnotism. Suggestion without the use of hypnotism is often malicious. . . . By its use on the part of the 'Mother of Christian Science' thousands of innocent but honest and conscientious followers are being robbed of their individuality and selfhood. . . . Here is the stronghold of the patent medicine vender, health food manufacturer and advertising medical quack. . . .

"The least dangerous of all forms of suggestion is hypnotic suggestion intelligently and conscientiously applied. There is absolutely no difference between hypnotic suggestion and suggestion without hypnotism. It is the same kind, only a difference in degree as regards its effect upon the physical organism. Suggestion without hypnotism, even used unconsciously, may stealthily and subtly dominate the mind without the consent of the individual, while hypnotic suggestion, intelligently applied for the relief of functional ills of the physical organism, is

* London Electricity, August 28, 1903.

always employed with the individual's consent. . . . One can not be hypnotized without the consent of the true ego—never, against his will or without his co-operation."

Munroe makes a strong plea for instruction in physiological psychology in medical colleges, and for children being taught to understand the power that lies in mind, how to use it to maintain a healthy body and how abuse of it leads to increased susceptibility to disease. This knowledge will put the practice of medicine upon a higher plane and aim a deathblow at pseudo medical charlatanism. The question is whether physicians shall investigate the laws that govern the influence of the mind in the treatment of disease and make use of them in therapeutic measures or leave it to those who make use of suggestion in disguised forms and without scientific knowledge.

Dr. J. M. Aikin, clinical instructor and lecturer on nervous and mental diseases in the medical department of the University of Nebraska, read a paper, entitled "Mental Therapeutics in Medicine," at the last meeting of the Nebraska State Medical Society. He also pleads for instruction in physiological psychology, and the application of its principles in regulating the effect of the mind over the body functions.

Two chief reasons are assigned for the shunning of mental therapeutics by so many physicians. First, the reaction from the long period in which superstition and witchcraft dominated the healing art, and the gradual recognition that by directing physical and chemical remedies in action on material structures effects were produced which appealed to perception as beneficial to the individual. Second, exploration in the materialistic realm, presenting as it does, so many tangible facts, has detracted from inquiry into the intangible domain of the mind. Neglect of this field allowed it to be possessed by the illiterate who would perceive effects without reasoning to their cause. "If wresting the physical and chemical treatment of disease from the realm of superstition to its present plane of rational medicine has been difficult, the rescue of mental therapeutics from mesmerism, hypnotism, Dowieism, Christian Science,—plus the multitude of 'pathies' each of which is but an excrescence on rational medicine,—is harder." In concluding he cites the case of a woman who had been unable to walk for twenty years and was restored to perfect health in a few weeks by suggestions plus a little phosphate of soda.

BOOK REVIEWS.

STORIES OF A COUNTRY DOCTOR. By WILLIS P. KING, M. D., of Kansas City, Mo. Illustrated; published by the Chicago Clinic Publishing Co., Price, \$1. For sale by the Abbot Alkaloidal Co., Chicago, Ill.

This book, written by a physician of large experience in the rural districts of western Missouri, who has lived to see the

remarkable development of the last generation, contains a degree of wit and humor which is truly refreshing to the reader, either lay or professional. The work contains many valuable observations and suggestions which bespeak the familiarity with the peculiarities of human nature in the foibles, suspicions, and inconsiderate treatment of the profession by the ignorant layman. There is a freshness, earnestness, honesty, and common sense running through the pages of this work which can but impress the reader. The stories and experiences related in the characteristic style of the writer will impress the reader who has had experience in rural practice with the truthfulness of the picture. The book should have a large sale and will be highly appreciated by the physician and layman in all walks of life.

HIGH-FREQUENCY CURRENTS IN THE TREATMENT OF DISEASES. By CHISHOLM WILLIAMS, F. R. C. S. Edin., Member of the Royal College of Surgeons, Eng.; Licentiate of the Royal College of Physicians, Lond.; Licentiate of the Society of Apothecaries, Lond.; Electro-Therapeutist West London Hospital, W.; Surgeon Out-Patients City Orthopedic Hospital, E. C.; Honorary Secretary British Electro-Therapeutic Society, etc. New York. Rebman Company, 10 West 23d St., 1903. Price, \$2.00 net.

This valuable work gives a very complete description of the various apparatus employed for high-frequency work, except in the consideration of the static machine which Dr. Williams does not appreciate as a valuable source for high-frequency currents. Observers in this country who employ the static machine will be disappointed in the brief consideration accorded the subject in this work. Those, however, who employ the coil to the exclusion of the static apparatus will find in it a valuable source of information, and suggestions which will enable them by the purchase of an additional apparatus to derive satisfactory therapeutic results from their X-ray coils. The consideration in this work of the therapeutics, is general in character, not specifically describing the technique, which makes a work of this kind so valuable to the general practitioner. The results obtained in the treatment of the cases reported are certainly gratifying, and from an able authority as Dr. Williams will encourage a more thorough investigation of the subject. It is only to be regretted that the work does not contain more details as to method.

PSYCHO THERAPY IN THE PRACTICE OF MEDICINE AND SURGERY. By SHRELDON LEAVITT, M. D. Chicago: Garner Taylor Press, 79 Fifth Avenue, 1903. 247 pp. Price, \$2.00 net.

This book contains little that is new, but much that is practical. The "New Methods," so called, are based upon Hudson's famous hypotheses of the dual mind and their assumed properties, with the additional hypotheses "That all disease has its origin in the mind, the subjective taking its cue from its

environments, from the fears, the constitutional bent, the impressions from other minds, misinterpreted sensations, etc.

"That prevention of disease consists in keeping the subjective mind under the power of wholesome suggestion: and that the cause of disease consists in the use of suggestions running counter to disease and the establishment of subconscious thoughts of health, inculcated by conscious volition." Upon these principles are based all methods of psychic cure he mentions.

Several pages of brain anatomy and development are added though their application to the above views is not explained.

Telepathy is largely depended upon in treatment, and Hudson's absurd proposition that the physician treat his patient while both are asleep is referred to with approval.

The instructions as to framing suggestions in producing hypnosis and in therapy are very good and carefully emphasized by free use of italics and capitals. The suggestions to be used in producing anæsthesia for surgical purposes are especially good.

The author is of the homeopathic persuasion, but frankly says that that method of treatment is less successful since the novelty has worn off and the psychic impression thereby decreased.

The author is apparently greatly in earnest, but has not discussed his views with hard-headed friends. L. M.

A COMPEND OF HUMAN ANATOMY. By SAMUEL O. E. POTTER, M. A., M. D., M. R. C. P. Lond. Formerly Professor of the Principles and Practice of Medicine in the Cooper Medical College of San Francisco; Author of the "Handbook of Materia Medica, Pharmacy and Therapeutics," "Quiz-Compend of Materia Medica," "Index of Comparative Therapeutics," and "Speech and its Defects"; Late Major and Surgeon of Volunteers, U. S. Army. Seventh Edition, Revised and Enlarged with 138 wood engravings; also Numerous Tables and 16 plates of the Arteries and Nerves. Philadelphia, P. Blakiston's Son & Co., No. 1012 Walnut Street. 1903. Price 80 cents net.

The seventh edition of this popular compend is a guarantee of the steady demand for a work of this kind. The busy practitioner or student who wishes a condensed manual for reference or preparation for examination will find in this volume a work accurate, reliable, and containing the essentials of anatomy arranged with an ample number of good cuts, a valuable addition to his library. The work is also provided with a complete index, so important in a reference book of this character.

SOCIETY MEETINGS.**AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION. THIRTEENTH ANNUAL MEETING.**

Held in Atlantic City, N. J., September 22, 23, and 24, 1903.
Daniel R. Brower, M. D., of Chicago, President.

(Continued.)

In lieu of a report from the committee on cataphoresis, Dr. Francis B. Bishop described an interesting experiment in cataphoresis that he had made. He said that last winter, in performing some experiments, he had discovered that the high-frequency current, as transmitted through a transformer, would penetrate glass, and transmit through the glass metallic and liquid substances. The experiment was made with the Piffard coil excited by a Toepler machine of twelve revolving plates. Two panes of glass were thoroughly cleansed, and between them was placed a solution of starch. The two plates were then sealed together with paper and a paste made of starch. Then, a solution of iodide of potassium in glycerine was placed upon the center of the upper plate of glass, and the lower plate of glass was placed upon a metallic surface and connected with the earth. The spark employed came from one side of the Piffard coil, and was directed upon the solution of iodide of potassium in the middle of the upper plate. In the course of a few minutes the iodide starch reaction was discovered, showing that the current not only passed through the glass, but carried the iodine with it. In order to see if this action would take place in both directions, he then began using a solution of iodide of potassium on enlarged joints with the high-frequency currents, using a thin hollow glass electrode filled with a solution of starch. After using this electrode for several weeks small specks of iodide of starch could be seen floating around in the fluid. Unfortunately the electrode had been broken before coming to this meeting, or he would have taken pleasure in exhibiting it.

Dr. T. A. Pease said he had confirmed the fact referred to by Dr. Bishop, and he now had in his possession an electrode in which the particles of iodide of starch could be seen floating in the fluid.

Dr. George Z. Goodell said that he had manufactured from a large high-frequency electrode of wood and carbon what he wanted. Around the electrode he had put paper. Along the course of the fine wire, extending from the machine to the granulated carbon, was to be seen dirt, showing that the particles had been carried along.

Mr. R. G. Brown said he believed Dr. Bishop had been misled, for the plates had not been sealed entirely around. It was probable that the iodide was carried by static electricity between the two plates.

Dr. W. J. Herdman criticised the terms employed, contending that the word which should have been applied to these experiments was not a cataphoresis, but "phoresis."

Dr. Margaret A. Cleaves said that she understood electrolysis and phoresis to be the two physical properties of the current. This action should not refer to the introduction of drugs into the tissues, but to the action of the current upon the electrolyte. If there were an anaphoresis, there was a very decided cataphoresis. When one spoke of the introduction of drugs into the tissues of the body, one should not use the same term as that applied to the physical property of the current, and, hence, she would suggest the terms "cataphoric" and "anaphoric" medication in this connection.

Dr. Bishop said that whether the iodide of potassium was carried through the glass or around the glass, in either event it demonstrated that the iodide of potassium solution had been decomposed into its natural elements, and was transmitted by the current. The plate used measured 8 by 10 inches, and a one-inch spark was used between the discharging rods. The electrode was held not more than half an inch from the glass. By the use of these electrodes the current could be easily seen to pass through the glass in a dark room rather than going around.

Dr. C. R. Dickson asked if any of the members had tried any experiments on the phoretic or electrolytic action of ultra-violet light.

Dr. W. B. Snow said that all who were familiar with vacuum tubes, other than the Geissler type, could but observe the physical demonstration that the current passed through the glass.

Dr. A. C. Geyser said that the subject was very interesting, but he was not quite satisfied as to whether the iodine turned the starch blue, or whether it was the ozone which was being liberated at the poles. If a starch solution was on the inside of the glass electrode and a wire was passed into this solution, the starch would turn blue regardless of any medicament placed on the outside. He had experimented and obtained such a result a number of times without using any potassium iodide.

Dr. W. B. Snow presented the report of the committee on static machines and condensers, as follows:

Your Committee would respectfully report that they have investigated, as far as opportunities would permit, the various machines on the market.

We find that there are in the country upwards of ten manufacturers of static machines. Of these manufacturers, but two are known to construct machines of the Holtz type and one of

the Wimshurst. All the others are manufacturing Toepler-Holtz machines. Of these machines none of the essential features for current production are patentable, but various attachments and devices have been patented which give advantages under certain conditions.

These three types of machines possess advantages and disadvantages with reference to each other. The current output of the Holtz type of machine, other things being equal (the number and diameter of revolving plates), is greatest; *i. e.*, a Holtz machine, other things being equal, will produce a spark length greater than the Toepler-Holtz or the Wimshurst. The advantage of the Toepler-Holtz and Wimshurst is that during periods of humidity, being self-exciting, less energy is required by the operator to get up an initial charge than with a Holtz machine. On the other hand, the Holtz machine, if properly cared for, will rarely require the excitement of the initial charge when in daily use, even during periods of humidity. Physicians too often neglect to care for their machines properly, and it must be borne in mind that no static machine in constant daily use, either of the Holtz or Toepler-Holtz type, will go on working indefinitely without renovation as the nitrous acid and ozone evolved eventually interfere with the working of the apparatus. The current output from the Toepler-Holtz type of machine calls for a larger revolving plate to derive the same spark length.

Another feature of many static machines which militates against the best qualities of the apparatus and the convenience of the physician is the construction of the insulated platforms, many of which are made with insulated legs not to exceed six inches in length and often less and many of these platforms are too small to permit the placing of an operating chair upon them in such a position that the patient may be treated lying down.

These criticisms are offered in line of suggestion; believing that the manufacturers are all desirous of giving the best satisfaction to their patrons. The American manufacturers of static machines are to be congratulated upon the general excellence of their productions. No machines in the world to-day equal the American static machines, and the increasing demand for these machines, and the future success in this branch of electro-therapeutics, calls for the encouragement which will lead to the production of the most perfect apparatus which can be made, and that every maker will strive to produce the best machine, and not endeavor to cheapen the cost of production or the selling price by lessening the good qualities of the apparatus as may and has been done in some cases by the employment of insufficient insulation.

Respectfully submitted,

WM. BENHAM SNOW.

G. BETTON MASSEY.

Members of the Committee.

He also presented the report of the committee on the St. Louis Exposition in 1904:

Your Committee would respectfully report that letters have been written to all of the manufacturers of electro-therapeutic apparatus in this country inviting them to make displays at the St. Louis Exposition and that the response has been very satisfactory, and that the display of electro-therapeutic apparatus will be large and attractive. But few of those who have been asked have found it impossible to place an exhibit at the Exposition. We are therefore encouraged to believe that much will be done by the manufacturers at this time to advance the future of electro-therapeutics.

The Committee have thought it best to suggest to the members of the Association that an exhibit of electro-therapeutic results in the form of skiagraphs, photographs, showing the results in the treatment of cases, electrodes, and such other evidences of the progress and interest in the subject be added to the exhibit, and the Chief of the Department of Electricity, Professor Goldsborough, of our Committee, will accord the Association and members of the profession a prominent place for such an exhibit.

The Committee will appreciate any suggestions that may be given with reference to this or any other matter which might rightly be expected of them.

The Committee feels indebted for the valuable assistance of Mr. R. G. Brown, for which they wish to express their appreciation, and would ask if it be the pleasure of the Convention that Mr. Brown be added to the Committee.

The Committee have received cordial invitations from David R. Francis, President of the Exposition, and Edward C. Culp, Secretary of the Committee of Ceremonies, to hold the next annual session of the American Electro-Therapeutic Association in St. Louis during the week from the 12th to the 17th, inclusive, at which time will be held a series of Electrical Congresses.

"The Committee on Ceremonies will, if desired, recognize the presence of the American Electro-Therapeutic Association by setting apart a special day or by providing some distinctive feature of the programme. The Exposition management will also be prepared to furnish without charge a satisfactory hall for the holding of the meetings of the Association."

We have also received a letter from Mr. G. D. Benson of the United Improvement Co., which we believe worthy of consideration.

Your Committee respectfully urges that the next meeting of the Association be held at St. Louis and that these invitations be accepted.

The meeting of the Electrical Congresses, at this time, will be of so much interest to many of our members that it will

afford a rare opportunity for mingling with those leaders eminent in electrical research.

Respectfully submitted,

WM. BENHAM SNOW,

W. E. GOLDSBOROUGH.

Members of the Committee.

Mr. Marshall, of St. Louis: In supplementing the report of the committee on the St. Louis Exposition, I wish to speak a little further. The scope of the Committee is probably familiar to you all. I show you a ground plan of the Exposition, which covers an area of two miles in length by one mile in width. Already there are forty-seven miles of pavements and streets laid upon the grounds. Automobiles and automobile chairs will enable one to get around easily. A plot of ground of five acres has been set apart for a hotel, which will accommodate six thousand people. The rates at this hotel are absolutely under the control of the Exposition authorities, and will be such as one would find in any large city. At the time this Association is invited to the Exposition there will be no other conventions except electrical ones, and the weather will be more comfortable than at other times. The electrical exhibit will be arranged so as to show the actual workings of the various apparatus.

Dr. W. J. Herdman: One thought comes to me in this connection, and that is as to the concentration of all that pertains to electro-therapeutic work in one space. In the Chicago Exposition this was not the case, the German and English being in different places, and the American electrical exhibits being scattered all over.

Mr. Marshall replied that this classification would be concentrated in one place with the exception that German manufacturers must be in the German section and the French in the French section, but the great majority would be American manufacturers, and they would all be located in one place.

Mr. R. G. Brown said that some months ago he had written a circular letter to most of the societies in Europe, and also to the members of the last international congress of electro-therapeutics, asking if they could come over to the St. Louis Exposition if an electrical congress were held. A number of replies had been received conditional upon the holding of the meeting in the fall.

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